VOLUME 11 NUMBER 4 APRIL 1985 $2.95

QA76
C68
cop.2

Creative Computing

THE #1 MAGAZINE OF COMPUTER APPLICATIONS AND SOFTWARE

Try One of Our Programs on Your Computer

Apple Programming Contest: Page 108

IN-DEPTH EVALUATIONS:

Morrow Pivot
Dimension 68000
Concurrent PC-DOS
Hush 80 Printer
C. Itoh 7500EP Printer
Pre-school Software
SAT Packages
College Explorer

Technology: Detecting Defects in an IC

PCs Power Real-World Flight Simulators

An Interview With Astronaut Alan Bean

1985 Winter Consumer Electronics Show: The Latest and Greatest

New Commodore 128

Selecting a Notebook Computer Under $1000

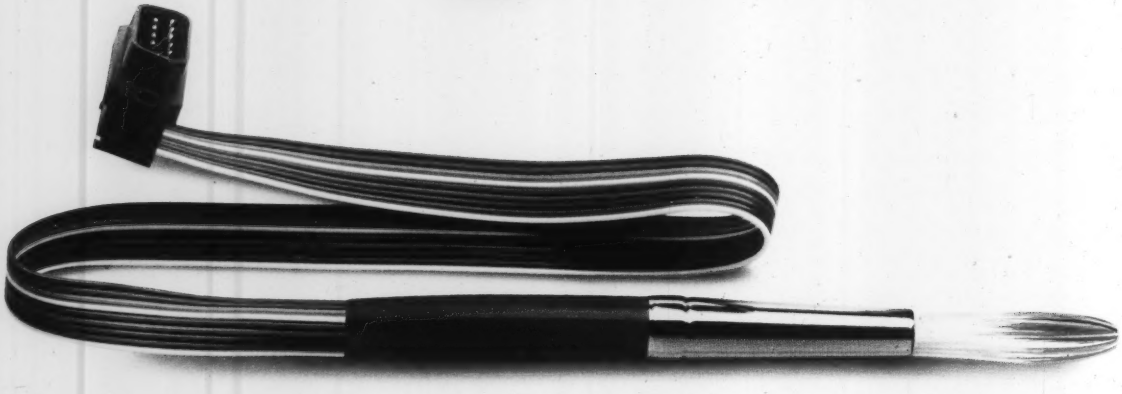
Columns: Apple, IBM, Tandy, Atari, Industry Insider, New Products

0 14024 14044

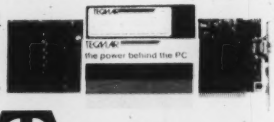
*****5-DIGIT 97331
630581 LOE G0000096 1415 JUN88
M2D42060197
LIB SERIALS DEPT D44LL
OREGON STATE UNIV
ST UNIV CAMPUS OR 97331

MAR 1985
LIBRARY
Oregon State University

Now make your PC paint.



Make it draw. Shade. Color. Erase. Create perfect circles. Ellipses. Rectangles. With the touch of a button. Print on screen and off in a variety of type fonts. Gothic. Roman. Old English. Script. Print in light. Medium. Bold. Italicize. Underline. Outline. Kern. Make it print in a wide range of point sizes. Make it cut. Make it paste. Make it all happen in one package. With Tecmar's Graphics Master™ Board and PC Paintbrush*Software.



Make a trip to your dealer for a demonstration. Or, make a call to Tecmar for the dealer nearest you. (216) 349-0600.

Tecmar
THE POWER BEHIND THE PC

*Registered trademark of the ZSoft Corp.

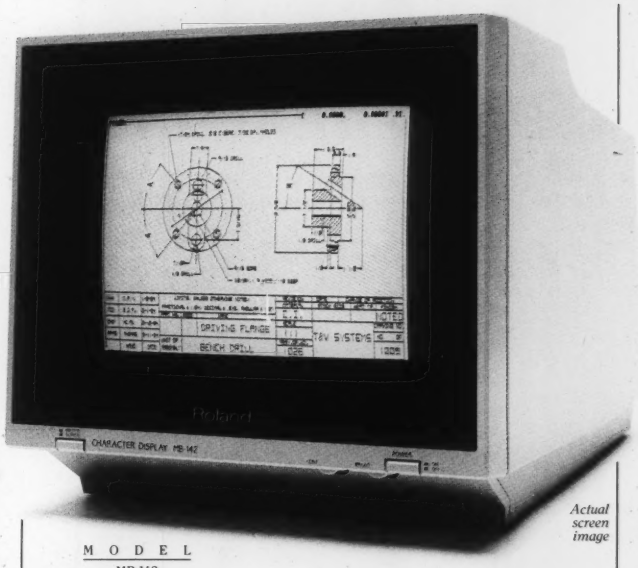
CIRCLE 158 ON READER SERVICE CARD

Now Showing In Black And White

If you own an IBM-PC or PC work-alike, Roland's new MB-142 monitor lets you show off your text and graphics in today's hottest colors—black and white. That's right! The MB-142 gives you black characters on a paper-white background—just like people have been reading for centuries. You can also have white characters on a black background with just the touch of a button.

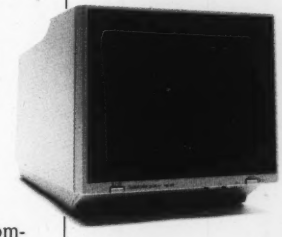
Both of these black and white display formats are easier on the eyes and less fatiguing than the green or amber phosphor used in standard monochrome monitors. The MB-142's large 14-inch screen, combined with its ultra-high 720 x 350 resolution, can display characters that are larger and more legible than what you can get with ordinary monochrome monitors. Another great plus is that the MB-142 plugs directly into the monochrome board of your IBM or compatible—just like your present monochrome monitor, with nothing more to buy.

Because of the MB-142's advanced electronic circuitry, you even have the ability to mix graphics and text on the same display when using graphics and text boards from leading manufacturers such as Persyst, STB, Paradise, Hercules, AST and many others. What makes it all possible? The same sophisticated technology used in color monitors.

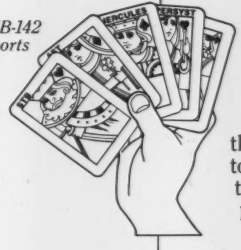


Actual screen image

M O D E L
MB-142



The MB-142 supports all the winning cards



Push a button for instant reverse screen

For business, black and white makes more sense than green and black

The big difference is that the MB-142 monitor does the job for significantly less money. The MB-142 is designed to interface economically, too. Imagine seeing your favorite business graphics or CAD/CAM packages, such as Lotus 1-2-3, Energraphics, Chart-Master, AutoCAD, CADDraft and VersaCAD, in ultra-high resolution black and white. Also, take full advantage of your program's windowing capability using the large 14-inch screen.

Take a good look at the differences that set the MB-142 apart from the rest. No other monochrome monitor gives you the fatigue-free black and white viewing, text and graphics capabilities and easy interface.

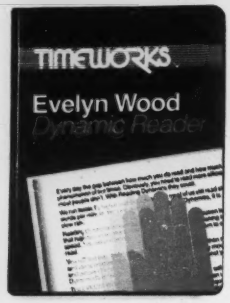
Naturally enough, the MB-142 is from Roland DG—the new computer peripherals company that's pointing the way to the future. Look for this and other Roland products at fine computer dealers everywhere.

For more information, contact: Roland DG, 7200 Dominion Circle, Los Angeles, CA 90040. (213) 685-5141.

The software programs listed are trademarks of the following companies: AutoCAD, AUTODESK, Inc.; CADDraft, Personal CAD Systems, Inc.; Chart-Master, Decision Resources, Inc.; Energraphics, Enertronic Research, Inc.; Lotus 1-2-3, Lotus Development Corp.; VersaCAD, T&W Systems, Inc.

Roland DG

CIRCLE 167 ON READER SERVICE CARD



The Evelyn Wood Dynamic Reader.™ Now, the world's most renowned master brings the techniques of Dynamic Reading to your computer.

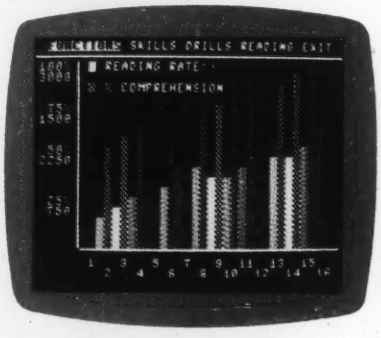
Learning to read faster isn't good enough. With the *Evelyn Wood Dynamic Reader,* you'll learn to read three to ten times faster—but with better comprehension and retention.

Only Timeworks brings this highly successful reading program into your computer. It will guide you like a gifted teacher through the drills and exercises at your own comfortable pace, automatically record your progress, and let you graphically review your results on colorful bar charts.

If it takes you more than 30 seconds to read this ad, you need Evelyn Wood.

Reading Dynamics is not a skimming or "key word" association technique. It is a totally different reading concept that registers every word, every idea, every shade of meaning in the written material. You will use more of your mental capacity and learn to concentrate. Your mind won't wander while you read.

Reading *dynamically* is more enjoyable than reading the old way. Complete thought patterns and ideas emerge from the written material in a smoothly moving picture. Instead of perceiving individual bits and pieces of information and putting them together as best you can, you will see total concepts. Reading *dynamically* is like living in the material.



The Evelyn Wood Dynamic Reader provides you with the exercises and tools you need to help you increase your reading comprehension and speed. Your own personal computer helps you develop your skills at your own pace.

You learn the essential techniques of Dynamic Reading in your own home—at any time convenient for you. You can repeat exercises as often as you wish to assure that you maintain optimal reading efficiency. Each program contains 50 Skill-Builder exercises, 20 reading exercises and 40 quizzes.

Only Timeworks offers the *Evelyn Wood Dynamic Reader.* Now at your favorite dealer. Or contact Timeworks, Inc., 405 Lake Cook Road, Deerfield, IL 60015. Phone: 312-948-9200.

Available for Commodore 64;* IBM;* Apple;* Atari.*

Timeworks Programs:
Data Manager 2 ■ Word Writer ■ Swiftax ■ Money Manager ■ Electronic Checkbook ■ Business System Series ■ Dungeons of Algebra Dragons ■ Spellbound ■ Cave of the Word Wizard ■ Computer Education Kits

TIMEWORKS

©1984 Reading Dynamics, Inc. and Timeworks, Inc. All rights reserved. *Registered trademarks of Commodore Computer Systems, International Business Machines Corp., Apple Computer, Inc., Atari, Inc.

CIRCLE 147 ON READER SERVICE CARD

VOLUME 11 NUMBER 4 APRIL 1985

Creative Computing

PRODUCT REVIEWS

32 **Morrow Pivot**/*Ahl*
A portable MS-DOS computer with built-in disk and modem

38 **Dimension**/*Anderson*
A 68000 machine that does impressions

42 **Concurrent PC-DOS**/*Terry*
When integration isn't enough

45 **Hush 80 Printer**/*Linzmayer*
Thermal dot-matrix print at a bargain price

46 **C. Itoh 7500EP**/*Linzmayer*
A happy marriage of form and function

81 **Preschoolers Learn at Home**/*Smith*
Math packages encourage fun, learning, and togetherness

86 **Growing Up Literate**/*Staples*
An update on SAT preparation software

93 **College Explorer**/*Ahl*
A valuable aid to choosing a college

OVERVIEW

64 **Goodbye, Little Red Schoolhouse**/*Crowell*
Educational software from 54 manufacturers

FEATURES

50 **1985 Winter Consumer Electronics Show**/*Ahl*
New Products from the show floor

52 **Inside an IC**/*Adams*
Using ultrasound to detect defects

95 **Subatomic Tombstones**/*Payack*
Concrete poetry?

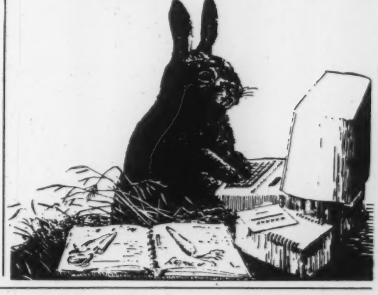
NEW PRODUCTS

55 **What's New In Hardware**/*Lockwood*
Peripherals for all computers

58 **What's New in Software**/*Lockwood*
Spreadsheets, word processors, graphics, and more

APPLICATIONS

98 **More Than One Way To Skin a Rabbit**/*Ahl*
Generating Fibonacci sequences



99 **Wondrous Numbers and Other Diversions**/*Milligan*
The Tortoise challenges Achilles

DEPARTMENTS

6 **Industry Insider**/*Ahl*
Commodore vs. Atari

10 **People and Profiles**/*Anderson & Staples*
Astronaut Alan Bean; the Stonehenge Watch

16 **Book Reviews**/*Lockwood*
Careers, Logo, and the marketplace

22 **In Real Time**/*Lockwood*
Singer: From sewing machines to space shuttles

28 **Telecommunications Talk**/*Sandler*
The Reader's Guide goes electronic

62 **Editorial**/*Staples*
Educational computing: Where are we now?

102 **Notebook Computing**/*Ahl*
Choosing a notebook computer for under $1000

108 **Apple Cart**/*Linzmayer*
Programming contest!

111 **Tandy Gram**/*Commander*
Third-party DOSes make Color Computer programming easier

116 **Commodore's Port**/*Leemon*
The C128: Three machines in one

120 **Outpost: Atari**/*Small*
New computers and peripherals, Plato, and rumors

124 **IBM Images**/*Fastie*
Mini-reviews of nine useful products

The Cover: Goodbye, Little Red Schoolhouse. Our software schoolhouse embodies the educational theme of this month's issue. Exploring some of the latest educational tools are David Grosjean, son of Reviews Editor Paul Grosjean; Joshua Bicknell, son of Artist Eugene Bicknell, and Erin Henry, a friend of the family. Photography by Jeff MacWright. Schoolhouse by Peter Kelley.

Creative Computing (ISSN 0 097-8140) is published monthly at 3460 Wilshire Blvd., Los Angeles, CA 90010 by Ahl Computing, Inc., a subsidiary of Ziff-Davis Publishing Company. David Ahl, President; Elizabeth B. Staples, Vice President; Selwyn Taubman, Treasurer; Bertram A. Abrams, Secretary. 39 East Hanover Ave., Morris Plains, NJ 07950. Second Class Postage paid at Los Angeles, CA 90052 and additional mailing offices. Copyright © 1985 by Ahl Computing, Inc. All rights reserved. Editorial offices located at 39 East Hanover Ave., Morris Plains, NJ 07950. Phone (201) 540-0445. Domestic Subscriptions: 12 issues $24.97; 24 issues $43.97; 36 issues $57.97. POSTMASTER: send address changes to Creative Computing, P.O. Box 5214, Boulder, CO 80321. Call 800-631-8112 toll-free (in New Jersey call 201-540-0445) to order a subscription.

STAFF

Founder/Editor-in-Chief: **David H. Ahl**

Editor: **Elizabeth B. Staples**

Managing Editor: **Peter Fee**

Associate Editor: **John J. Anderson**

Assistant Editors: **Owen Linzmayer**
Russ Lockwood

Reviews Editor: **Paul Grosjean**

Editor-at-Large: **Ken Uston**

Contributing Editors: **Will Fastie**
Susan Glinert-Cole
Danny Goodman
Stephen B. Gray
Glenn Hart
Bill Jacobson
Brian Murphy
Ted Nelson
Peter Payack

Editorial Assistants: **Jane M. Lewis**
Carol A. Crowell

Secretary: **Alexis Leffeld**

Art Director: **Patrick Calkins**

Assistant Art Director: **Chris DeMilia**

Artists: **Eugene Bicknell, Peter Kelley**

Typesetting: **Dianna Mizell**

COMPUTER PUBLICATIONS DIVISION

President **Kenneth H. Koppel**
Senior Vice President **Eileen G. Markowitz**
Vice President, Editorial **Jonathan D. Lazarus**
Vice President, Production **Baird Davis**
Vice President, Licensing & Special Projects **Jerry Schneider**
Vice President, Creative Services **Herbert Stern**
Vice President, Circulation **Alicia Marie Ivans**
Vice President, Circulation Services **James Ramaley**
Marketing Manager **Ronni Sonnenberg**
Business Manager **Gary A. Gustafson**
Editorial Director **Ernest F. Baxter**

PERMISSIONS

Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Jean Lamensdorf, Ziff-Davis Publishing Company, One Park Avenue, New York, New York 10016.

ADVERTISING SALES

Publisher
Claude P. Sheer, Creative Computing
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5011

Advertising Coordinator
Lisa Crandall, Creative Computing
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5012

Western Advertising Manager
Jeff Miller, Ziff-Davis Publishing Company
11 Davis Drive
Belmont, CA 94002
(415) 598-2290

Southern California, Southwest
Tom Martin
Ziff-Davis Publishing Company
3460 Wilshire Blvd.
Los Angeles, CA 90010
(213) 387-2100

New England
Merrie Lynch, Nancy Wood
CEL Associates, Inc.
61 Adams Street
Braintree, MA 02184
(617) 848-9306

Midwest
Jeff Edman, William Biff Fairclough
The Pattis Group
4761 W. Touhy Ave.
Lincolnwood, IL 60646
(312) 679-1100

Mid-Atlantic, Southeast
Larry Levine
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5013
(201) 972-9466

Canada
The Pattis Group
501 Eglinton Ave. E.
Suite 202
Toronto, Ontario M4P IN4
(416) 482-6288

ATTENTION: AUTHORS

Creative Computing will not be responsible for the return of unsolicited manuscripts, cassettes, floppy disks, program listings, etc. not submitted with a self-addressed, stamped envelope.

WHERE TO SEND IT

All **editorial** material, including article submissions, press releases, and products for evaluation should be sent to:

Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950

Correspondence regarding other Creative Computing products and publications should also be sent to the Morris Plains address. Correspondence related to **advertising,** including ad copy, questions on billing, and requests for rates, should be sent to:

Advertising Department
Creative Computing
Ziff-Davis Publishing Co.
One Park Ave.
New York, NY 10016

Correspondence regarding **subscriptions,** including orders, changes of address, and problems should be sent to:

Creative Computing
P.O. Box 5214
Boulder, CO 80321

Your help in choosing the correct address for your correspondence is appreciated. An incorrectly addressed letter or package can take as long as several weeks to reach its proper destination.

SUBSCRIPTIONS

All subscription orders and other correspondence related to subscriptions should be addressed to:

Creative Computing
P.O. Box 5214
Boulder, Colorado 80321

Foreign subscriptions must be accompanied by payment in U.S. currency.

Subscription prices:

U.S.		Canada		Foreign	
1 year	$24.97	1 year	29.97	1 year	34.97
2 years	43.97	2 years	53.97	2 years	63.97
3 years	57.97	3 years	72.97	3 years	87.97

Airmail delivery on foreign subscription is available for a one-year period only at $75.00 additional for mail to Asia and Australia, and $50.00 additional for all other foreign.

Subscribers in the United Kingdom may send payment in sterling to:

Hazel Gordon
10 Bishops Way
Sutton Coldfield
West Midlands B74 4XU

Please allow at least eight weeks for change of address. Include old address as well as new—enclosing if possible an address label from a recent issue.

THE SAKATA CONNECTION

Your personal computer deserves the unequalled monitor quality of Sakata

Your computer deserves the most monitor quality value possible...and so do you. SAKATA CRT DISPLAY MONITORS give you more monitor quality than the most expensive monitors available. Each SAKATA MONITOR provides unequalled color reproduction; sharpest and most vivid graphics; text that you read more easily than you ever expected; and technical characteristics and capabilities that will amaze you.

Protect your personal computer's performance by utilizing SAKATA CRT MONITORS which provide the utmost in monitor value. Choose from an entire line of Composite Color; RGB High Resolution Color; RGB Super High Resolution Color and two monochromes (green and amber) that have more quality than other monochrome monitors. **"We promise performance".**

SAKATA CRT MONITORS are available wherever personal computers are sold or write for technical and illustrated literature and prices.

SAKATA U.S.A. CORPORATION
651 Bonnie Lane, Elk Grove Village, IL 60007
(312) 593-3211 800-323-6647 (outside Illinois)

Sakata

"Serving industry worldwide since 1896"

CIRCLE 243 ON READER SERVICE CARD

The HBJ Computer Test Preparation Series

This *proven* study method has helped thousands of students score higher on the SAT, GRE, and ACT.

Each package contains: double-sided diskettes, a comprehensive review textbook, and a 50-page User's Manual.

COMPUTER PREPARATION for the SAT® $79.95
Available for: Apple, Atari, Commodore, IBM-PC, IBM-PCjr, and TRS-80.

COMPUTER PREPARATION for the GRE® $89.95
Available for Apple, IBM-PC, and IBM-PCjr.

COMPUTER PREPARATION for the ACT NEW! $89.95
Available for Apple.

ORDER NOW!

Ask for these HBJ programs at your local computer store or bookstore or call

800-543-1918

for major credit card orders.
In CA call collect 619-699-6335.

HARCOURT BRACE JOVANOVICH
HBJ
1250 Sixth Avenue
San Diego, CA 92101
CC485

CIRCLE 117 ON READER SERVICE CARD

INDUSTRY INSIDER

David H. Ahl

Commodore vs. Atari

Commodore and Atari are the two major competitors in the mass merchandiser arena. Sam Tramiel, president of Atari, and Frank Leonardi, vice president of marketing for Commodore, spoke out at CES about their plans.

Commodore is said to have notoriously bad dealer relations. Leonardi: "Commodore's relationship with its distribution is a normal one for the consumer electronics industry. Dealers are opportunistic, which is good, because it puts a lot of pressure on manufacturers to constantly strive for new things."

Atari is apparently trying to set high quotas for its dealers. Tramiel: "We are a very flexible company, and everything is negotiable." With respect to collecting from old accounts, "All the old business we inherited from Warner has been put aside and is totally separate from new business and new orders."

Commodore sees the channels of distribution becoming more similar. Leonardi: "The large computer chains (Computerland, Entre) do their merchandising in a way that is similar to the large mass merchants (K-Mart, Sears). They're looking for leaders to bring the customers in and step up items for the high end."

Atari sees youngsters as the key to selling home computers. Tramiel: "The kids know what to do with computers because they use them in school. It is a critical part of our marketing plan to sell to school systems. We've set up an education group within our sales organization to do that."

Leonardi on Commodore's competitors: "Apple and IBM."

Tramiel on Atari's future: "More powerful 32-bit computers, more aggressive pricing, and new electronics products using advanced audio/video technology."

Random Bits

Business Communications of Stamford, CT, forecasts 20% annual growth over the next five years in business microcomputers, 22% in peripherals, 38% in maintenance, 41% in communications, and 46% in software . . . **AT&T** claims its Unix System V is gaining support, particularly now that **Microsoft** has agreed to make its Unix-type system, Xenix, compatible with System V. Nevertheless, some software vendors are shying away from Unix because of AT&T's recently announced more restrictive licensing policy . . . Like **Eagle Computer**, another troubled PC clone maker sees China as salvation: **TeleVideo Systems** just signed an agreement with three Chinese companies to manufacture and market PC-compatible machines there . . . Looking for a winner in 32-bit Unix systems? **Charles River Data Systems** is shipping product and has just signed OEM deals with both Datapoint and Sord of Japan. Financial backers include EG&G, Analog Devices, Meditech, and now Datapoint.

Apple's fourth quarter earnings leaped nearly eightfold to a record $46.1 million on strong Christmas sales of the Apple II line . . . Also posting gains were **IBM** with a 17% earnings increase in the fourth quarter and **DEC** with a 37% gain. On the other hand, **Kaypro's** profits plunged by 97% while **Tandy's** fell 24% . . . **Coleco** posted a fourth quarter loss estimated to be between $65 and $80 million which it largely blames on the ill-fated Adam. The **Odd Lot** subsidiary of Revco reportedly bought Coleco's inventory of Adams; expected street price is below $300. Unbelievably, at CES Coleco privately showed a new computer said to be Apple compatible; development was said to be "close" to completion.

Keeping track of the players department: **Corona**, a vendor of IBM PC clones, has a manufacturing agreement with **Daewoo**, the huge Korean conglomerate. It also buys boards from **Sanyo** in Japan. On the other hand, Corona supplies finished computers to **Sperry, Philips**, and **Docutel/Olivetti** . . . **MicroPro** and the Ass'n of Data Processing Service Organizations (ADAPSO) have filed suit against the Wilson Jones unit of American Brands, alleging infringement and unauthorized copying of *WordStar* and other Micro-

Beware of imitations.

There's only one Logo that can lay claim to being the original. And that's Terrapin™ Logo.

Terrapin is the original Logo developed at the Massachusetts Institute of Technology. It has been field-tested extensively. And it has been in use for over 10 years. Today, there are hundreds of thousands of satisfied Terrapin Logo users. That's because over 100,000 copies of Terrapin's Logo for Apple and Commodore microcomputers are in use.

Terrapin Logo is simple. And powerful. So, whether it's college or kindergarten, Terrapin Logo is the ideal Logo.

It's the best value your money can buy, too. For example, Terrapin is available for microcomputer networks, such as Corvus Omninet, PRO-NET and VIC-Switch. If you don't have access to networking, Terrapin Logo is available in money-saving 10- and 20-disk Terra-Paks for the Apple II family.

Being the original Logo also means we support you. Whenever you want, you can speak with our technical staff about whatever you want. Plus, we publish frequent enhancements to Terrapin Logo, and our award-winning documentation. Which means you can be assured that Terrapin is always the best Logo available.

To better understand why the original Logo is the best Logo, send for our free Reference Card. Or, if your school district has a microcomputer evaluation center, call for our special offer.

Terrapin Logo. It encourages exploration. It encourages learning. It's fun. And it's the original that keeps getting better.

Terrapin™

The Original Logo People

Terrapin, Inc., 222 Third Street
Cambridge, MA 02142, (617) 492-8816

CIRCLE 160 ON READER SERVICE CARD

There are Terrapin Logo versions for the Apple II family of microcomputers (with 64K RAM) and the Commodore 64 and Plus 4.
Terrapin Logo is a registered trademark of Terrapin, Inc. Apple is a registered trademark of Apple Computer, Inc.
Commodore and VIC are registered trademarks of Commodore Electronics, Ltd.

ACT NOW!
$9.95 VALUE

FREE OPUS DISKETTE HEAD CLEANER

With Purchase of OPUS "Unfloppable Floppies"

OPUS has a money saving offer to get you to try our floppies, the most reliable on the market today. Purchase 20 OPUS 5-1/4" diskettes and you can receive a Free UNIVERSAL HEAD CLEANER ($9.95 value), for use on single or dual-side drives.

Purchase OPUS diskettes at your local computer store, send two box tops, a dated sales receipt, and coupon and we will send your Free Head Cleaner.

Or – order by mail and receive Head Cleaner with your shipment.

Or – Call, Toll Free: 1-800-692-6905, Dept. (M), to charge on your VISA or MasterCard.

Now you have a money saving reason to try OPUS diskettes. You will have "NO BAD MEMORIES!"

OPUS®
NO BAD MEMORIES

SEND TO: OPUS Computer Products
Dept. CC 485, 150 Chicago Street
Cary, IL 60013
Universal Head Cleaner offer

Name _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

☐ Proof of Purchase Enclosed OR SHIP ME ____ Boxes of OPUS 5-1/4" Diskettes:
CHECK ONE: ☐ $19.95 Single-Side 10-pack ☐ $29.95 Dual-Side 10-pack
Add $1.50 for shipping & handling (Illinois residents add 6% sales tax.)
TOTAL ENCLOSED: $ _____ (Check or Money Order Only)

Charge to my: ☐ VISA ☐ MasterCard

Account Number: _____ Expiration Date: _____

Signature: _____

CIRCLE 141 ON READER SERVICE CARD

INDUSTRY INSIDER

Pro software, ADAPSO originally announced that four "top 50" companies would be named in the suit but only American Brands (#77) was named . . . *Advertising Age* named **John Sculley** of Apple, Adman of the Year . . . If you didn't watch the end of the Superbowl, you might have missed Apple's single commercial. It showed a long line of drably dressed men and women in single file singing, "Hi ho, hi ho, it's off to work we go," as they marched over the edge of a cliff. Apple hoped that viewers would make the connection with IBM.

Analysts see the home computer market returning to more orderly growth in 1985. Infocorp projects 1985 sales of 5.7 million units, up from 4.4 million in 1984 and 3.4 million in 1983 . . . **Management Science America** is apparently negotiating to sell **Peachtree Software** to **McGraw-Hill**. Also for sale are MSA's Designware and Edu-Ware in which both **CBS** and **Scholastic** have expressed interest . . . A bankruptcy court judge has rejected a plan for **HES** to be acquired by Advant Garde after Microsoft and Spinnaker, two HES creditors, objected to the proposal . . . The **NY Better Business Bureau** has issued 15 challenges involving nearly 50 misleading and fraudulent computer advertising claims. The BBB challenged such claims as "Save $700" and "50% off" and also questioned "reduced" price sales that never end. A booklet, "Tips on Buying a Home Computer" is available for a SASE from the BBB, 257 Park Ave. South, New York, NY 10010.

On the horizon: A graphics entry device called **Space Tablet** which lets you draw in three-dimensional space . . . We hear that the top priority project at **Pioneer** is a writable videodisc for the home market . . . Peter Leppik, a 15-year-old hacker who had been accused of breaking into the computer files of a Minneapolis bank, recently helped police crack the disk protection code on a sex offender's electronic diary. Peter claimed the bank break-in was "accidental." . . . **Mother Jones' Son's Software Corp.** has an unusual way to combat piracy. Its sales agreements state that if the buyer copies the program illegally, "ownership of your eternal soul passes to us, and we have the right to negotiate the sale of said soul." The agreement adds, "Our attorneys will see to it that life on earth, as you know it, is completely ruined." . . . Immortalized? The on-board computer in the Star Fighter computer/videodisc game from Pioneer/ASCII is named the **AHL-1.** ■

ALL AIRLINES DEPART FROM THIS TERMINAL.

Presenting Travelshopper℠ ...new from CompuServe and TWA.

Now you can save time and money by getting information and reservations on virtually any flight on any airline—worldwide—from one source. It's TWA's new Travelshopper, available now through CompuServe's Information Service.

With Travelshopper, you can scan flight availabilities, discover airfare bargains and order tickets...on your own personal computer...at home or in the office.

You also receive automatic membership in TWA's Frequent Flight Bonus℠ program. And you can build bonus points by staying at Marriott and Hilton hotels and by using Hertz Rent-A-Car.

Besides Travelshopper, CompuServe offers an ever-growing list of other travel-oriented on-line services.

The Official Airline Guide Electronic Edition lists direct and connecting flight schedules for over 700 airlines worldwide plus over 500,000 North American fares.

Firstworld Travel offers worldwide travel advice and service.

Discover Orlando provides complete prices, hours and features on all of Central Florida's attractions and accommodations.

West Coast Travel offers travel information for the western states.

Pan Am's Travel Guide contains up-to-date information on immigration and health requirements for most foreign countries.

And TravelVision® provides complete automotive information, including road maps and an expert, personalized routing service.

Let your travel plans really take off. Use Travelshopper and lots, lots more from CompuServe.

To buy a CompuServe Starter Kit, see your nearest computer dealer. To receive our informative brochure, or to order direct, call or write:

CompuServe

P.O. Box 20212, 5000 Arlington Centre Blvd.
Columbus, Ohio 43220

1-800-848-8199

In Ohio, Call 614-457-0802

An H&R Block Company

Travelshopper and Frequent Flight Bonus are Service marks of TWA

CIRCLE 111 ON READER SERVICE CARD

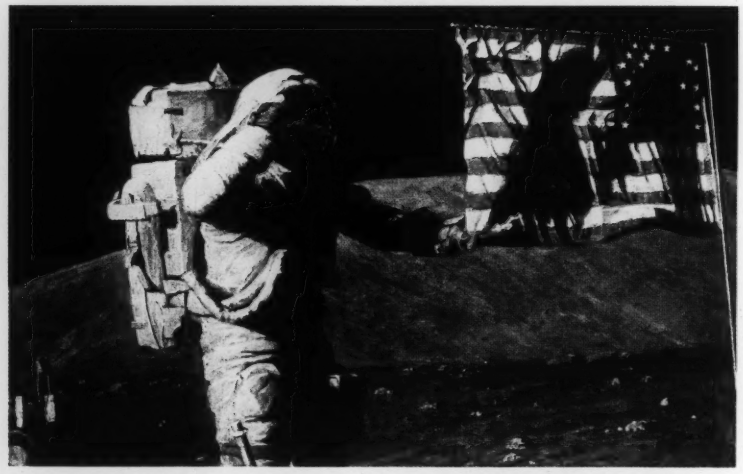
Alan Bean

Betsy Staples and John J. Anderson

Former astronaut Alan Bean: fourth man to walk on the moon; lunar module pilot; spacecraft commander of Skylab II, a mission which logged a world record 24,400,000 miles in flight; a man with over 7000 hours of flight time in the air, in addition to over 1500 in space who has flown 27 different types of military aircraft as well as many civilian airplanes; arguably a man with plenty of the Right Stuff. He has access to just about any computer you can name, and probably to a few you cannot.

What does he use computers for? "Not much," says the soft-spoken ex-Naval test pilot, with a Yeageresque twang. "They still can't do the things I want to use them for. As far as record-keeping goes, it's much easier to use a pencil and paper." I found myself agreeing with him. "Someday," he continued, "one will come around with the power I need for my work, and then I'll snap it up. Until then, I'll use a paintbrush."

Full-time artist Alan Bean: his work "Night Launch" hangs in the Smithsonian; at his first one-man show, 75% of his paintings were sold within the first 30 minutes; and virtually all of his work depicts the space frontier. "In the long view, I hope I come to be seen the way Charles Russell and Frederick Remington are viewed now—artists who experienced the frontier they painted. I'd like to be the artist who painted this generation's frontier, which, of course, is space."



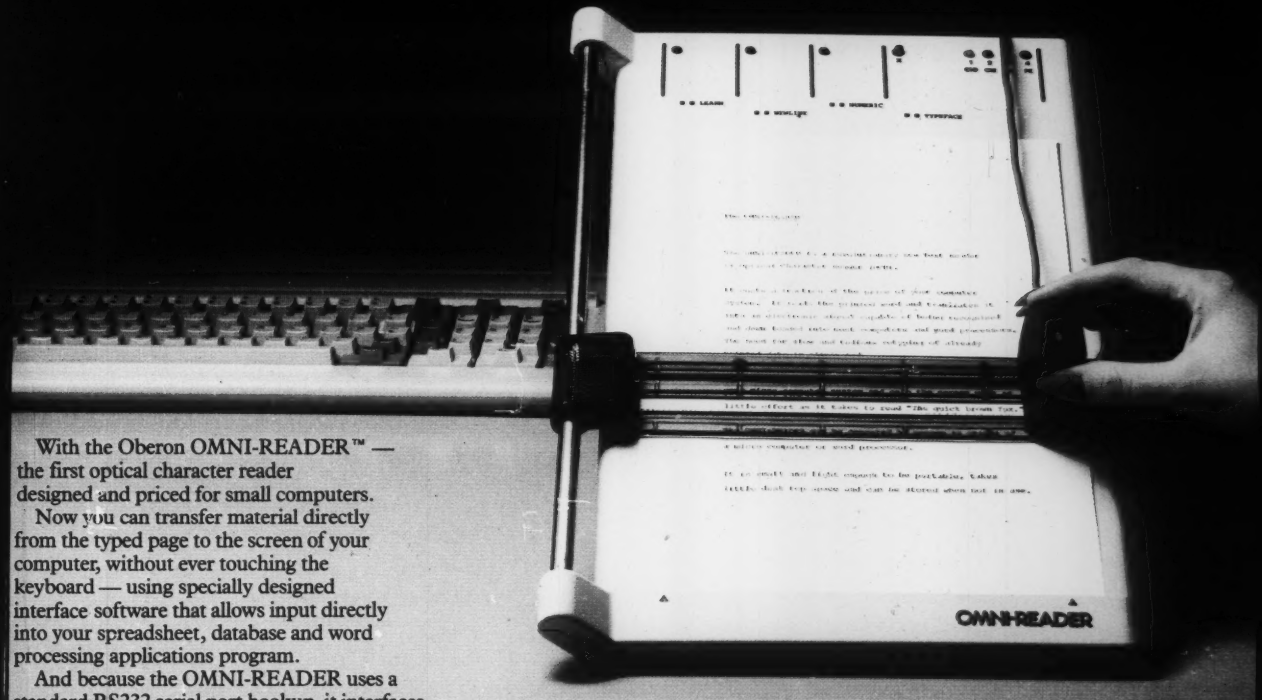
Why paint a subject that has been so thoroughly documented photographically? "The moon photos were of course taken in very bright light. They lack the subtlety of color and sense of depth that I saw when I was there. I concentrate on these in my work. The lens of a camera and the eye of an artist are very different things."

Bean began studying drawing and painting in night school over 20 years ago while he was still a Navy test pilot. It remained a hobby until 1981, when he decided to devote himself to painting full time. "When I realized that most of us who actively participated in this incredible adventure and could tell all the stories first-hand would be gone in less than 30 or 40 years, I began to realize that if any credible artistic impressions were to remain for future generations, I must paint them now."

When will the artist move from acrylics on masonite to computer-generated art? "When a hi-res micro can simply handle three-dimensional data structures, and allow me to position the background, subjects, and 'camera,' as it were, I will use it to compose paintings." Even then, however, he will rely on his trusty brushes.

Bean is represented by Meredith Long and Co., 2323 San Felipe Rd., Houston, TX 77024. (713) 977-8186. His paintings start at about $4000. ■

Now your IBM PC and AT can read



With the Oberon OMNI-READER™ — the first optical character reader designed and priced for small computers.

Now you can transfer material directly from the typed page to the screen of your computer, without ever touching the keyboard — using specially designed interface software that allows input directly into your spreadsheet, database and word processing applications program.

And because the OMNI-READER uses a standard RS232 serial port hookup, it interfaces easily with *your* computer.

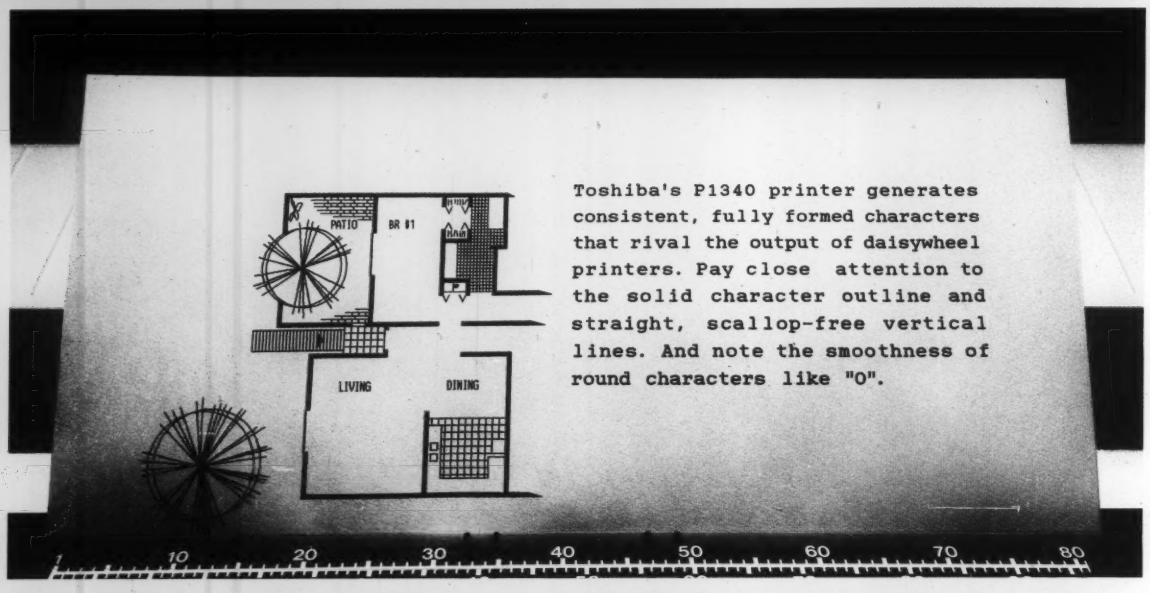
The technology is revolutionary. But what is most revolutionary is the price — under $500. IBM interface software, $50.

Find out more about the Oberon OMNI-READER. Dial 800-2-OBERON. In Texas, (214) 446-9567.

IBM is a registered trademark of International Business Machines.

OBERON
INTERNATIONAL

CIRCLE 137 ON READER SERVICE CARD



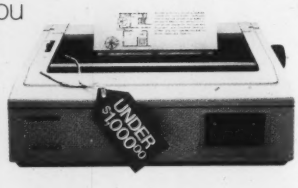
Toshiba's P1340 printer generates consistent, fully formed characters that rival the output of daisywheel printers. Pay close attention to the solid character outline and straight, scallop-free vertical lines. And note the smoothness of round characters like "O".

Now you can make a great impression for under a grand. The Toshiba P1340 3-in-One printer.

Toshiba has been a pioneer in printer technology and development. Where we have led, others can only follow. Our P1340 printer is an impressive example—the first 3-in-One printer for less than $1,000 that provides high-speed, letter-quality copy, high-resolution graphics and an advanced 24-pin dot matrix print head. And at only $995, the Toshiba P1340 is priced well within your reach.

Perfect impressions. Our unique high-density 24-pin dot matrix print head gives you sharp, clean results from any of the P1340's three resident typefaces. With its 8-mil print wire and overlapping dot pattern, you get letter-quality daisy wheel sharpness and definition—at dot matrix speed.

Impressive speed. You won't have to give up speed for letter-quality results. Because the Toshiba P1340 gives you the best of both. At 54 cps, you get letter-quality copy at better than twice normal letter-quality speed. And even faster draft copy at 144 cps.



An impressive eye for detail. The Toshiba P1340 doesn't just give you high speed, letter-quality type. At 180 x 180 dots per square inch, it also gives you high-resolution graphics that lead the industry.

Impressive versatility. The P1340 is versatile enough to give you your choice of three different resident typefaces. With bold type, underscores, super- and subscripts. And a wide range of condensed printing, line and proportional spacing choices.

And since it features Qume SPRINT 5™ emulation and choice of parallel or serial interface, the Toshiba P1340 3-in-One™ printer can work with an impressive number of word processing programs. And almost every microcomputer, including IBM PC® and Macintosh.™

Impressive price. The Toshiba P1340 printer. It's more than an impressive 3-in-One printer. At only $995, it's also a great buy. For more information call 1-800-457-7777, Operator 32.

SPRINT 5 is a trademark of Qume Corp. IBM PC is a trademark of International Business Machines. Macintosh is a trademark of Apple Computer Inc.

CIRCLE 162 ON READER SERVICE CARD

In Touch with Tomorrow

TOSHIBA

TOSHIBA AMERICA, INC., Information Systems Division

PROFILES

Larry Jackel

Blue Ridge Summit, PA, a town of 300 people, is the site of one of the most modern book distribution centers in the country. On January 15 TAB Books opened the 35,000 square foot center to house and process orders for its 800 "how to" technical titles in the computer, electronics, aviation, automotive, home repair, robotics, and general science fields. President Larry Jackel, who purchased the company five years ago, says he has never been tempted to move it to New York City where most of the country's large publishers are headquartered. He enjoys "the no hassle way of life," and claims that none of the publishing professionals he has imported from the big cities has ever left Blue Ridge Summit. "We work harder here," Jackel says. "Our business is run more intensely; there are fewer distractions, and we are in tune with the world."

Arthur C. Clarke

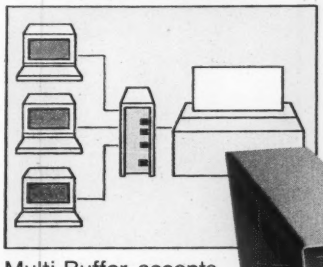
Arthur C. Clarke has decided not to wait until the twenty-first century—or even 1985—to take advantage of the electronic cottage. The noted science fiction writer used a Kaypro computer to communicate with director Peter Hyams as the two collaborated on the screenplay of "2010," MGM's sequel to Clarke's "2001." For six months, the computers allowed Clark in Sri Lanka and Hyams in Hollywood to span 8000 miles and 14 time zones, exchanging lengthy letters almost instantaneously. The entire Kaypro-to-Kaypro correspondence has been collected and will soon be published in a book called *The Odyssey Files.*

Peter Payack

His unusual poems are familiar to readers of early *Creative Computing* magazines. His ponytail and ever-present smile are familiar to visitors who have frequented Creative Computing booths at computer shows in Boston. Peter Payack, who once called himself an "underground poet," has surfaced and even gone a bit commercial. His latest "concrete poem" is the Stonehenge Watch, a plastic pocketwatch case that opens to reveal a miniature, plasticized Stonehenge. For those whose knowledge of Druidic horology is less than complete, a user's manual is included for the $12.95 price of the watch. The watch, Payack's first successful commercial venture (the poetry anthology in fortune cookies never really caught on) is just one of the ways in which he has tried to make poetry accessible. Other media he has used include airplane wings, plants, buttons, and subway walls. ■

INTRODUCING THE SCOOTER® MULTI-BUFFER™

Now One Printer Works Like Three.



Multi-Buffer accepts data from up to three micros, stores up to 64K* and inputs a single parallel printer. Automatically.
LED CPU Indicators show which computer is feeding data into the Multi-Buffer.
The Memory Indicator Bar Graph shows at a glance how much of the memory is available.
The Pause Switch stops printout temporarily. Especially convenient for paper changing.
The Copy Switch allows any current data segment to be reprinted at a touch.
The Reset Switch stops printing and clears the memory at your command.

*Also available in 128K, 256K and 512K models.

SCOOTER®
High Grade Cable Assemblies
ohm/electronics
P.O. Box 368
746 Vermont—Palatine, IL 60067
1-312-359-6040

® Scooter is a registered trademark of ohm/electronics.

One Year Warranty.
So if you need one printer to work like three, ask your computer dealer for Multi-Buffer. Or call or write SCOOTER today.

See Your Dealer or Order Now Before May 1 Price Increases.

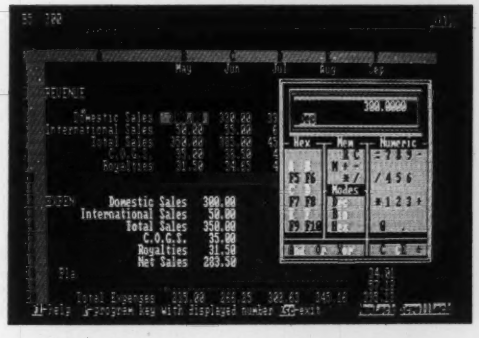
Please ship me: (indicate qty.)
_____ SP110-64K: $389
_____ SP110-128K: $598
_____ SP110-256K: $829
_____ SP110-512K: $1198
Ill. residents add 7% sales tax.
Total Amount
☐Visa ☐Mastercard
☐Check or Money Order
Card #
Exp. Date
Signature
Name
Address
City
State Zip
CCO485
Send to ohm/electronics
746 Vermont, Palatine IL 60067

CIRCLE 138 ON READER SERVICE CARD

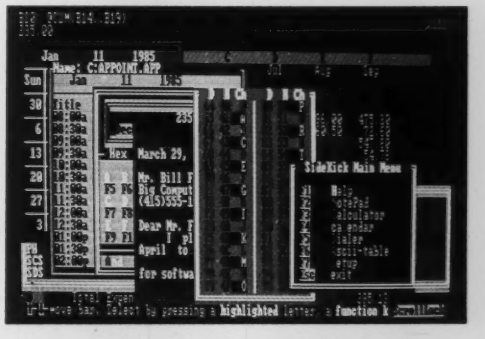
SIDEKICK
NOTES
* Bill - 303-742]
* Stocks
* Mr. Wilson is contact at Acme Hardware
JANUARY
TRADE SHOW
ASCII TABLE
ASCII TABLE
IBM
IBM
IBM
ROBERT STINNEY

Borland's SideKick Software Product of the Year

SideKick is InfoWorld Software Product of the Year. It won over Symphony. Over Framework. Over ALL the programs advertised in this magazine. Including, of course, all the "fly-by-night" SideKick imitations. SideKick . . . . Simply the best.



Here's **SideKick** running over Lotus 1-2-3. In the SideKick **Notepad** you'll notice data that's been imported directly from the Lotus screen. In the upper right you can see the **SideKick Calculator**.



All the **SideKick** windows stacked up over Lotus 1-2-3. From bottom to top: SideKick's **"Menu Window"**, **ASCII table**, **Notepad**, **Calculator**, **Appointment Scheduler/Calendar**, and **Phone Dialer**. Whether you're running WordStar, Lotus, dBase, or any other program, SideKick puts all these desktop accessories instantly at your fingertips.

InfoWorld *Report Card 1984 by Popular Computing, Inc., a subsidiary of CW Communications Inc. Reprinted from* InfoWorld, *1060 Marsh Road, Menlo Park, CA 94025.*

Jerry Pournelle, BYTE: *"If you use a PC, get SideKick. You'll soon become dependent on it."*

Garry Ray, PC Week: *"SideKick deserves a place in every PC."*

Charles Petzold, PC Magazine: *"In a simple, beautiful implementation of WordStar's block copy commands, SideKick can transport all or any part of the display screen (even an area overlaid by the notepad display) to the notepad."*

Dan Robinson, InfoWorld: *"SideKick is a time-saving, frustration-saving bargain . . . ."*

BORLAND INTERNATIONAL ***Software's Newest Direction***
4113 Scotts Valley Drive
Scotts Valley, California 95066
TELEX: 172373

NOT COPY-PROTECTED

SIDEKICK

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133

Yes, I want the Best.
Please send me SideKick!

SideKick Copy Protected
Quantity: ____ at $54.95

SideKick Unprotected
Quantity: ____ at $84.95*

Name: _____
Shipping Address: _____
_____
City: _____
State: _____ Zip: _____
Telephone: _____

* These prices include shipping to all U.S. cities. All foreign orders add $10 per product ordered.

PCjr requires not copy-protected version

Amount: (CA 6% tax) _____
Payment: VISA MC BankDraft Check
Credit Card Expir. Date: ____/____
Name on Card: _____
Card #: _____

COD's and Purchase Orders WILL NOT be accepted by Borland. California residents: add 6% sales tax. Outside USA: add $10 and make payment by bank draft, payable in US dollars drawn on a US bank.

Symphony, Lotus & Lotus 1-2-3 are trademarks of Lotus Development Corp. dBase & Framework are trademarks of Ashton-Tate. WordStar is a trademark of Micropro International Corp. SideKick is a trademark of Borland International. S20

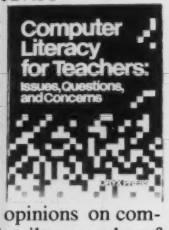
CIRCLE 102 ON READER SERVICE CARD

BOOK REVIEWS

Careers, Logo, and the Marketplace

Russ Lockwood

Computer Literacy for Teachers: Issues, Questions, and Concerns edited by John H. Tashner. The Oryx Press, 2214 N. Central at Encanto, Phoenix, AZ 85004. Softcover, 150 pages, $27.50

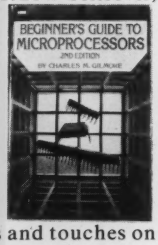


This compendium of 26 articles by educators, editors, and authors examines how teachers of grades K-12 should approach the use of microcomputers in the classroom. It presents differing opinions on computer curricula and details examples of how schools are implementing computer education programs.

The book leads off with a section discussing the influences, effects, and capabilities of computers in the classroom. Another section presents definitions of computer literacy, and a third examines exemplary computer programs from selected schools. Several appendices guide educators to numerous sources for more information.

Despite the obscene pricetag, this book presents an anthology of interesting views on a controversial topic. Teachers facing the dilemmas of classroom computerization will reap great rewards from this book.

Beginner's Guide to Microprocessors by Charles M. Gilmore. Tab Books, Blue Ridge Summit, PA 17214. Softcover, 218 pages, $9.95



This introductory text explains microprocessor architecture, technology, and functions to the "uninitiated" electronics enthusiast. It explains microprocessor programming concepts and touches on techniques for software documentation.

The book starts with the development of the microprocessor, moves into a thorough explanation of the binary, octal, and hexidecimal numbering systems, and then examines the logic behind digital circuits.

The book then delves into the microprocessor programming instructions set, including data transfer, arithmetic, logic, branch, subroutine, and special commands. It reviews important characteristics of seven popular microprocessors—Intel 8051, 8085, and 8088/8086; Zilog Z80; MOS Technology 6502; and Motorola 6802 and 68000—and ends with suggestions for home experiments using microprocessors.

Charles Gilmore stuffs a lot of information between the covers. Indeed, perhaps too much, for he sometimes overwhelms the novice with detail. Still, the informative text and multitude of diagrams, circuit schematics, and other illustrations make the *Beginner's Guide to Microprocessors* an invaluable reference.

The Netweaver's Sourcebook by Dean Gengle. Addison-Wesley Publishing, Reading, MA 01867. Softcover, 326 pages, $14.95

Telecommunications and local area networks (LAN) are hot topics in the microcomputer world. For those who have yet to discover their convenience, this book explains the concepts, terms, services, and potential of "micro networking and communications."

Dean Gengle does a fine job of deciphering the technical jargon and providing advice on designing your own LAN or micro-to-mainframe links. However, he goes beyond the hardware, software, and services to delve into the psychological and sociological implications of telecommunications.

On occasion, the book lapses into philosophical musings, but for networking facts, from both the technical and sociological viewpoints, *The Netweaver's Sourcebook* is an exceptional introduction.

Statistical Programs in Basic by Ronald D. Schwartz and David T. Basso. Reston Publishing, Reston, VA 22090. Softcover, 208 pages, $16.95

Designed with the student in mind, this book provides step-by-step Basic programming instructions for solving statistical problems on a computer. It assumes you already understand statistics, and presents a problem, the appropriate algorithm, a full listing of a program, and several example exercises.

The "text" consists of REM statements within the programs, each explaining why a particular command is used. Topics include summation notation, data analysis, probability, probability distributions, estimation theory, hypothesis testing, regression and correlation, analysis of variance, and nonparametric tests.

Schwartz, a mathematics professor, and Basso, a manager of information systems development, provide a no-nonsense approach to statistics problem solving.

1-2-3 Run by Robert and Lauren Flast. Osborne/McGraw-Hill, 2600 Tenth Ave., Berkeley, CA 94710. Softcover, 295 pages, $16.95

Many *Lotus 1-2-3* books tell you how to operate the program, in effect duplicating the manual. In contrast, *1-2-3 Run* provides cover-to-cover *Lotus 1-2-3* applications—41 of them—that you type into the program.

The book divides into two sections: business applications and home applications. Templates calculate cash flow analysis, accounting functions, sales summaries, expense logs, depreciation schedules, budgeting, and other financial functions.

If you want to use *Lotus 1-2-3* for a variety of business and home applications, take a close look at this book. It holds a minimum of fluff and a maximum of practical information.

TRAJECTORIES... A complete line of statistical software you can count upon to plot and project infinite solutions for today... and tomorrow.

No matter where your research analysis takes you, TRAJECTORIES statistical software programs meet the needs of most statistical requirements.

TRAJECTORIES SPS is a comprehensive disk based statistical analysis package that puts you at the forefront of creative problem solving with descriptive statistics and plots, parametric and non-parametric correlations, regression analysis, cross tabs, multivariate analysis, homogeneous and heterogeneous variances, plus much more. Retail price $395.00.

TRAJECTORIES TS enhances the Trajectories SPS package with Time Series Analysis which provides many fundamental transformations important to time series and forecasting statistical studies. Retail price $495.00.

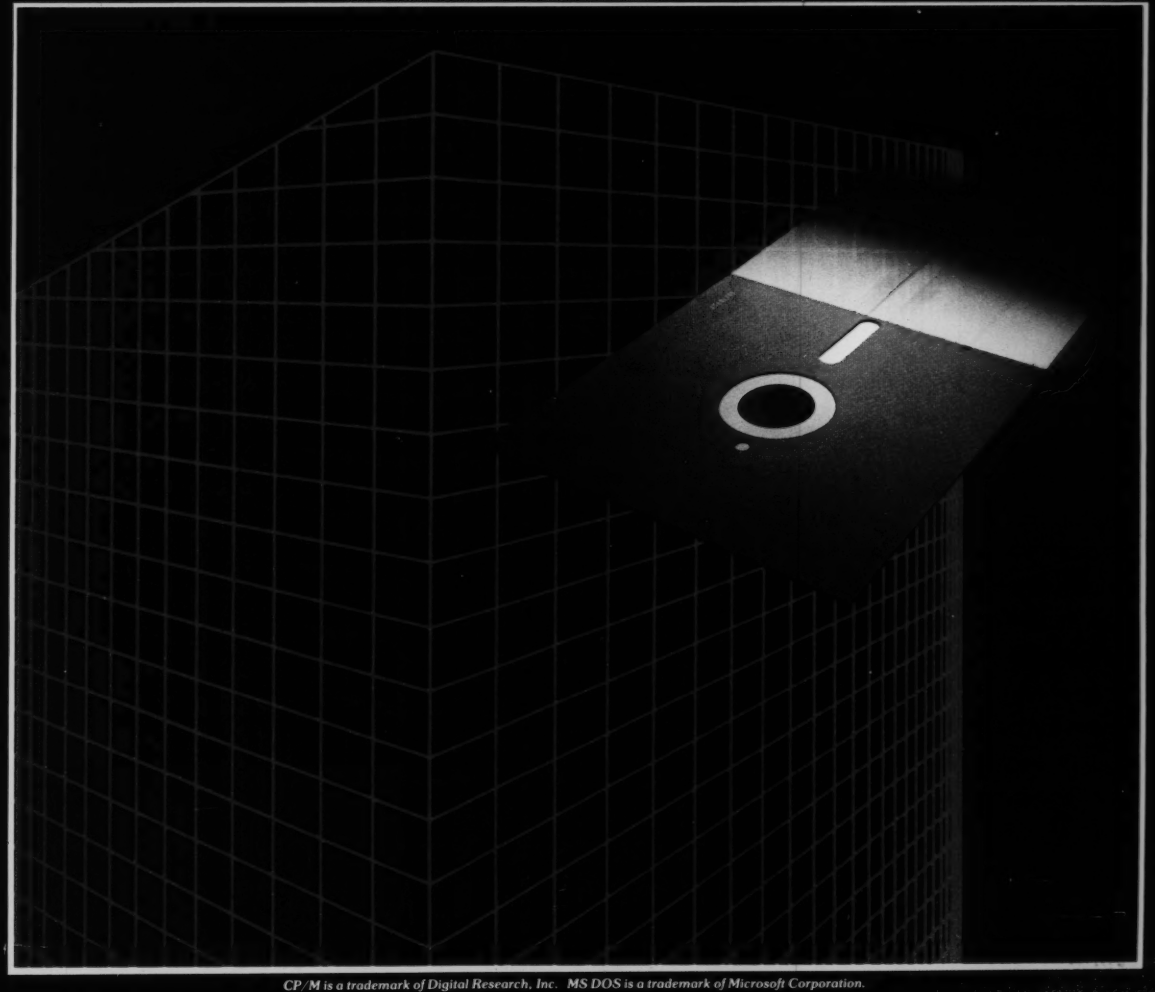
There's more... TRAJECTORIES PLUS adds to TRAJECTORIES TS an integrated data base management system and applications generator and makes your computer a true helpmate. Retail price $595.00.

TRAJECTORIES SPCI puts the power of statistical process control at your fingertips. Designed by America's leading source for training in statistical techniques, the American Supplier Institute, TRAJECTORIES SPCI is a package critical to quality control in any industry. Retail price $795.00.

All TRAJECTORIES products are easy to use, disk based and menu driven programs and run on CP/M and MS DOS systems with a minimum of 128K memory. SPCI requires 256K.

For the name of your nearest DBi dealer, or for more information about the TRAJECTORIES products, write DBi Software Products, One Energy Place, 5805 E. Pickard Rd., Mt. Pleasant, MI 48858 or call 1-800-221-3791, and in Michigan 1-800-624-8122.

dbi Software Products
Turning innovation into information.™
CIRCLE 120 ON READER SERVICE CARD



CP/M is a trademark of Digital Research, Inc. MS DOS is a trademark of Microsoft Corporation.

BOOK BRIEFS

Careers

High-Tech Career Strategies for Women by Joan R. Goldberg. MacMillan Publishing, 866 Third Ave., New York, NY 10022. Softcover, 290 pages, $9.95

This mixture of advice and pep talk explores career opportunities for women in high-tech fields. It covers job descriptions, job-hunting, and climbing the corporate ladder.

Careers in Computers by Texe W. Marrs. Simon and Schuster, 1230 Avenue of the Americas, New York, NY 10020. Softcover, 152 pages, $8.95

This job-hunting guide includes a good helping of common sense along with a lot of fluff. The best part is the listing of addresses of high-tech companies and support organizations.

Resumes for Computer Professionals by Arthur R. Pell, Ph.D. and George Sadek. Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. Softcover, 111 pages, $7.95

Top-notch how-to book helps professionals write a more effective resume. It includes 30 sample resumes, several cover letters, and the "10 Don'ts of Resume Writing." *Resumes for Engineers* is also available.

Better Resumes for Computer Personnel by Adele Lewis and Berl Hartman. Barron's Educational Series, 113 Crossways Park Dr., Woodbury, NY 11797. Softcover, 220 pages, $6.95

Excellent how-to guide presents professionals with an abundance of tips and techniques for writing effective resumes and cover letters.

Discover Your High Tech Talents by Barry and Linda Gale. Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. Softcover, 137 pages, $8.95

An aptitude test and capsule descriptions of 322 technical positions make up this superfluous book.

Logo

TI Logo by Harold Abelson. McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020. Softcover, 246 pages, $17.95

This book presents a potpourri of projects using Logo on the TI 99/4 and 99/4a.

Logo Fun by Pat Parker and Teresa Kennedy. Scholastic, 730 Broadway, New York, NY 10003. Softcover, 112 pages, $5.95

This inexpensive yet versatile guide presents projects and variations for Apple Logo, Terrapin/Krell Logo, Atari Logo, and TI Logo.

Commodore Logo by H. J. Bailey, T. H. Doran, and K. M. Brautigam. Brady Communications, Bowie, MD 20715. Softcover, 288 pages, $14.95

This introductory guide explores turtle graphics on the Commodore 64.

Nudges: IBM Logo Projects by Steve Tips, Timothy Riorden, and Glen Bull. Holt, Rinehart and Winston, 383 Madison Ave., New York, NY 10017. Softcover, 273 pages, $16.95.

Colorful beginner's guide to Logo on the IBM PC and PCjr suggests a multitude of projects.

Commodore 64 Tutor of Home and School by Julie Knott and Dave Prochnow. Scott, Foresman and Co., 1900 E. Lake Ave., Glenview, IL 60025. Softcover, 209 pages, $15.95

This handbook introduces Logo, Pilot, and Basic programming on the Commodore 64 to the beginner. It includes three sprite graphics and music programs.

Apple Logo: A Complete Illustrated Handbook by Drew Berentes. Tab Books, Blue Ridge Summit, PA 17214. Softcover, 376 pages, $13.95

This comprehensive handbook helps you wring the most out of Logo and your Apple II.

The Marketplace

The Elements of Friendly Software Design by Paul Heckel. Warner Books, 666 Fifth Ave., New York, NY 10019. Softcover, 205 pages, $8.95

This eccentric little book provides 30 practical principles for designing user-friendly software.

How to Document Your Software by Barbara Spear. Tab Books, Blue Ridge Summit, PA 17214. Softcover, 201 pages, $13.50

This handbook guides programmers in writing clear, organized manuals. It includes advice on preparing flow charts, block diagrams, and other graphics.

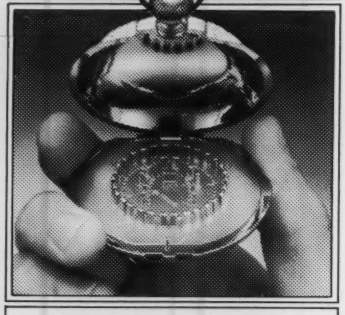
1985 Programmer's Market edited by Brad M. McGehee. Writer's Digest Books, 9933 Alliance Rd., Cincinnati, OH 45242. Softcover, 343 pages, $16.95

Glorious compilation of 700 microcomputer software publishers that use freelance material.

How to Copyright Software by M. J. Salone. Nolo Press, 950 Parker St., Berkeley, CA 94710. Softcover, 256 pages, $21.95

This invaluable reference details the procedures for copyrighting your programs and computer output. ■

THE STONEHENGE WATCH



Stonehenge: 5,000 years old and still ticking! And now you can own this faithful miniature reproduction of Stonehenge encased in a full-sized pocket watchcase. (2¼" diam. in exquisite Silver tone finish).

At last, you can predict an eclipse and tell the local time apparent with this beautiful pocket time piece. Delight your more erudite friends and amaze your druid neighbors.

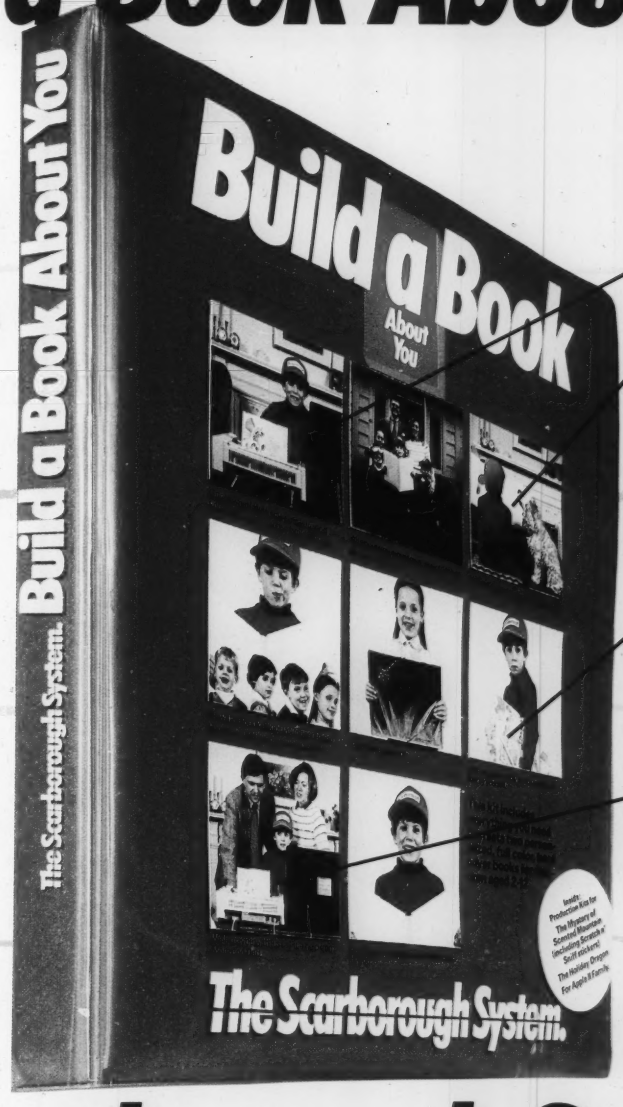
Comes complete with a 64 page instructional booklet by Peter Payack: *"Stonehenge Unraveled."*

The Idea Works, Inc.
P.O. Box 208 Pequanneck, NJ 07440
Please send me Stonehenge Watch @ $12.95 each. Postage & Handling + $1.50.
Total Enclosed
Charge It: ☐ MasterCard ☐ VISA
Acct. No. Exp. Date
Name
Address
City State Zip

VISA THE IDEA WORKS MasterCard

Build a Book About You with

Build a Book About You.



Parents,
There's nothing else like Build a Book About You! You and your child can create two personalized storybooks, all about your child, neighborhood, friends, family, pets. And it's a great gift, too.

Build a Book About You includes everything you need to print out two stories on full-color pages and bind them in durable covers just like real illustrated children's books. But there are four stories on every disk. So with additional supplies, now available at your store, you can use your disk to build more books. Reuse the disk over and over!

This software works on all popular printers and the program is so simple even kids can use it to build their own books! Books about themselves; sure to strengthen reading skills because kids will want to read them again and again.

Build a Book About You is a project you and your child can work on together, one your whole family will enjoy.

Kids,
Here's how easy and fun it is:

1. Take out the disk and put it in your computer.

2. The computer asks you some easy questions. How old are you? Where do you live? What's your best friend's name? You can answer those, right? Mom and Dad might want to help you type the answers.

3. Then take the pages of the storybook — have you got them? Ask Mom or Dad to help you load them in the printer.

4. Press the button and watch your book print out. Wow! There's your name! This book is about you!

Available for:
Apple II + /IIe/IIc
IBM PC/XT/PCjr
Commodore 64/128
and all popular printers.

The Scarborough System.

55 South Broadway, Tarrytown, N.Y. 10591

CIRCLE 153 ON READER SERVICE CARD

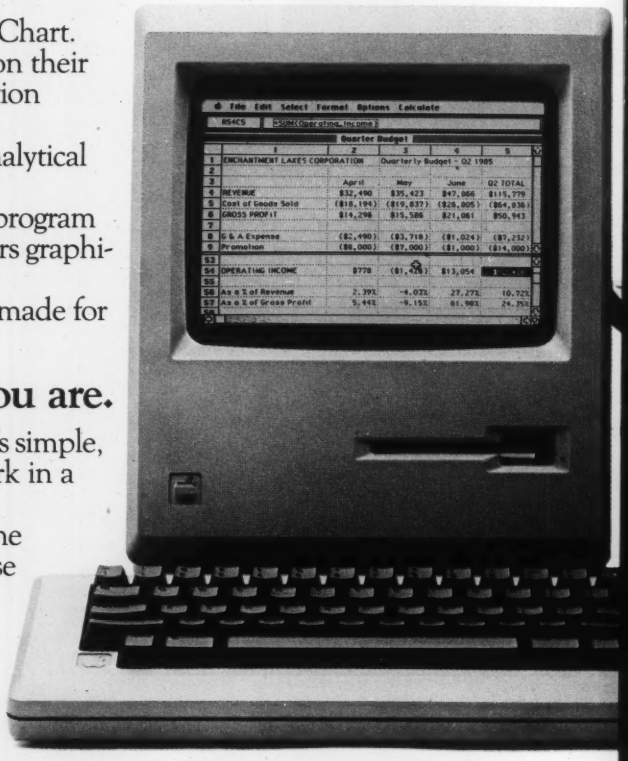
Find the Then draw your

Microsoft® Multiplan® and Microsoft Chart. They're crackerjack programs working on their own. But you should see this pair in action together on the Macintosh.™

The one, a spreadsheet of dazzling analytical power and graceful simplicity.

The other, a picture perfect charting program that makes rows and columns of numbers graphically clear.

And the beauty is, they were literally made for each other. And for Macintosh.



Multiplan accepts you as you are.

Multiplan takes full advantage of Mac's simple, intuitive operating style. So you can work in a way that will come natural to you.

You don't have to memorize any arcane commands. Just point and click the mouse to move mountains of figures and formulas quickly and painlessly.

In addition, Multiplan gives you features that make hard copies gratifyingly readable. For instance, the enviable ability to print sideways.

So you can't run out of column room. No matter how wide your spreadsheet gets.

Chart makes people see what you mean.

Microsoft Chart gives you lots of ammunition for your arguments: Pie charts, bar charts, line, column, area and scatter charts. Or combinations.

MICROSOFT®
The High Performance Software™

Pick the one that best illustrates your point. Then translate your numbers into pictures and have them on paper in a matter of moments.

Using the mouse, it's a cinch to fine tune the graphs to get exactly what you want. Move any section. Change its size, shape, or highlight it.

Chart can even be linked with Multiplan. So any change on your spreadsheet will show up automatically on the charts.

answer.
own conclusions.

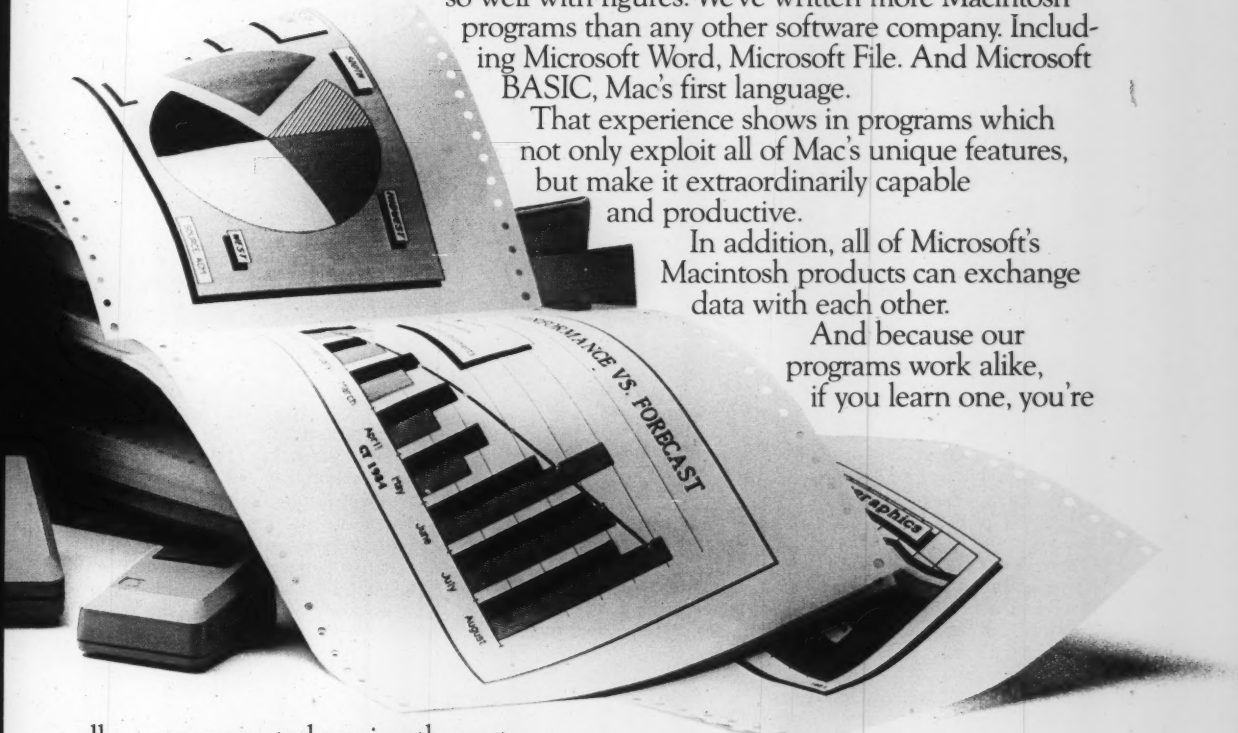
We get the max out of Mac.

It figures that we'd be the ones to make Mac work so well with figures. We've written more Macintosh programs than any other software company. Including Microsoft Word, Microsoft File. And Microsoft BASIC, Mac's first language.

That experience shows in programs which not only exploit all of Mac's unique features, but make it extraordinarily capable and productive.

In addition, all of Microsoft's Macintosh products can exchange data with each other.

And because our programs work alike, if you learn one, you're well on your way to learning the rest.



To find the name of your nearest Microsoft dealer, call (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088.

Then check out Multiplan and Microsoft Chart. And watch them perform some nice little numbers.

Microsoft and Multiplan are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation. Macintosh is a trademark licensed to Apple Computer, Inc.

CIRCLE 133 ON READER SERVICE CARD

IN REAL TIME

From sewing machines to space shuttles

Russ Lockwood

Most people recognize Singer as a manufacturer of sewing machines—not exactly hi-tech devices—yet some of Singer's less-publicized divisions design and manufacture a variety of high-technology products for the aerospace industry. Link Flight Simulation, which builds flight simulators, and Kearfott, which builds navigation and guidance systems, are not exactly household names, yet their products are crucial to the success of the Space Shuttle, Trident missile, B-1 bomber, F-16 fighter, Boeing 757 and 767, and numerous other civil and military aviation and aerospace projects.

Most aerospace companies, Link and Kearfott included, use mainframes and minicomputers for their programming, design, and engineering work. Microcomputers perform the more traditional office functions: word processing, spreadsheet analysis, and database management. However, Link and Kearfott are beginning to explore creative ways of applying the microcomputer to engineering problem solving.

The managers and task supervisors to whom we spoke at Link and Kearfott are enthusiastic about using microcomputers for engineering applications. They cite cost effectiveness over minis and mainframes and ease of use as specific advantages.

The latter reason is especially important. Austin Maher, Kearfott director for computer software engineering, points out that microcomputer operating systems are usually friendlier than their mainframe counterparts. Engineers can concentrate on solving problems rather than learning complicated command structures.

Another advantage is security. Russ Pepe, Link director of information resources, notes that many people have access to a mainframe, but a microcomputer can be physically isolated from unauthorized users.

The PC to Cessna Link

Link boasts that it is the leading manufacturer of flight simulators in the world. Indeed, its product list reads like a what's what in aviation: Space Shuttle, F-16 fighter, Boeing 767, B-52 bomber, Learjet, and AH-64 attack helicopter to name a few. These are top-of-the-line, multimillion dollar units with sharp mainframe and microprocessor-based visual systems. They precisely duplicate aircraft controls, including the ability to swivel and tilt in response to pilot actions.

The single engine flight simulator from Link. The student sits in the cockpit at left and the instructor controls from the IBM PC.

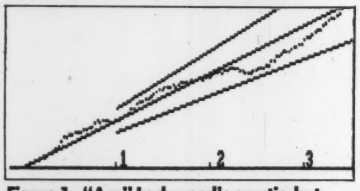


Figure 1. "Ace" Lockwood's erratic, but successful, landing.

On a more modest level, the newest flight simulator in the Link catalog mimics single engine airplanes. It features a fully instrumented cockpit, a visual system that operates roughly like a projection television, and a separate instructor station. The instructor station consists of an off-the-shelf IBM PC, joystick, Quadram Quadchrome RGB monitor, and Epson printer, hooked into an Aydin Graphics terminal.

The hard disk holds a database of maps, which can be edited to localize weather conditions and geography. The areas are stored using longitude and latitude coordinates. Project engineer Dave Tripp brags that the system can simulate any area in the world down to three-quarters of an inch.

As the student pilots the simulator, the instructor monitors the flight on the IBM PC. The instructor can introduce variables, such as nightfall, inclement weather conditons, and equipment malfunctions. The effects are faithfully reproduced in the cockpit and on the screen.

The keyboard of the IBM PC has custom keycovers with commands printed directly on them. The instructor merely presses a key to induce a change or begin a function. The programs are written in compiled Fortran with some assembly subroutines.

An especially nifty feature is called "snapshot." The instructor freezes a particular situation, such as a landing approach, with the snapshot function. Then, each time he presses the snapshot key, the student starts the simulation in that situation.

The joystick allows the instructor to change the position of the aircraft. To continue the example above, the instructor can call up the landing situation with the snapshot key and then change the heading of the aircraft with the joystick to simulate a different approach to the airport.

A printout (see Figure 1) from the Epson printer shows how the student fared in the simulation. The graphs display an optimum landing approach (center line) and acceptable limits (lines to either side of the center line). A dotted line indicates the student's actual approach.

A special combat simulation, between a student-controlled single engine plane and a computer-controlled F-18 jet fighter, is available (see sidebar). Yes, they did cripple the jet so it would not fly rings around the propeller-driven plane.

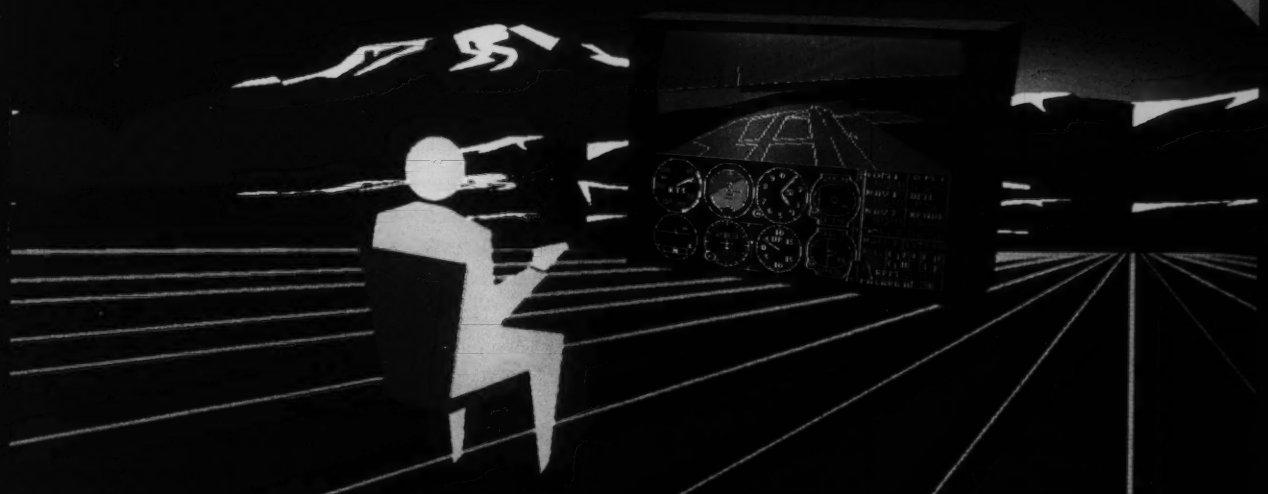
Potpourri of Applications

Kearfott is using microcomputers to help with engineering research on fiber optics networks, automatic data collection, and robotics.

Staff Engineer Michael Sottile is us-

Flight Simulator II

For Apple, Atari, & Commodore 64



Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

or write or call for more information. For direct orders enclose $49.95 plus $2.00 for shipping and specify UPS or first class mail delivery. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800 / 637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

CIRCLE 173 ON READER SERVICE CARD

ing a trio of IBM PC ATs to create a multiplex data communciations network using fiber optics. Multiplex networks with regular wires and cables are already used to interconnect workstations in the Space Shuttle and aircraft. Fiber optics will increase the speed and accuracy of communications.

Sottile chose the PC AT over other microcomputers because of its expandability, microprocessor speed, and IBM product longevity. The three microcomputers cost less than building a dedicated network from scratch—especially since no standards exist for 100MHz fiber optic communication networks.

The fiber optics cables attach to custom-made expansion boards (optical transmitters and receivers) that plug into the IBM PC ATs. Each computer has 256K RAM and uses the PC-DOS operating system. The input/output programming is done in assembly language; the main program in compiled Basic or Pascal.

Task Supervisor Frank Tamaro uses an IBM PC XT to collect and analyze test results of inertial navigation systems. Previously, a person collected 16 sets of data by hand and then punched the numbers into a calculator.

The navigation systems plug into dedicated test equipment, which is connected by cable to a custom-made expansion board in the PC XT. As the test equipment generates signals, the computer stores the data on the hard disk and performs the necessary calculations. A printer makes a hard copy.

Tamaro notes that the PC XT speeds up data analysis while saving many man hours of effort. It does not take coffee breaks and can collect data overnight during extended testing periods. Since the test results come back quicker, engineers can react faster to potential design problems.

Task Supervisor Herbert Rogall uses an Apple II Plus for robotics research and training. The computer connects to a commercially-available Microbot Inc. MiniMover 5 robot arm. Applesoft Basic programs control the arm.

In our demonstration, Rogall maneuvered the arm to stack three wooden blocks according to size. The computer stored the commands. Rogall then reset the blocks in their original positions. With the press of a button, the arm grabbed and restacked the blocks.

This apparently simple operation, picking up and placing objects, is the most common application of robotics,

The Apple-powered robot arm.

according to Rogall. Lessons learned on the Apple-controlled robot arm can be transferred to larger factory robots.

One for the Lawyers

According to some software companies, corporations are a hotbed of software piracy. Lotus Corp., for example, sued Rixon Inc. and Health Group Inc. for copying and distributing *Lotus 1-2-3* programs within their organizations.

Gus Raso, Kearfott manager of computer applications planning, who devised an anti-piracy program for the controller's office, contends that aggressive management practices are needed to protect the integrity of the division's data and equipment and to comply with the copyright laws. Under his plan, each floppy disk carries a copyright warning and a control number. In essence, the warning reinforces the idea that the program belongs to Lotus and data generated with the program belong to Kearfott. Spot checks are made to confirm that disks are where they belong.

Requiem for a Mainframe?

The trickle of microcomputers into the engineering labs of Kearfott and Link by no means marks the demise of the mainframe or the mini. High-technology products such as ring laser gyros and digital imaging systems require the speed, storage, and central location of a large computer.

However, progressive companies like Singer are learning that increases in computing power allow selected, hard-core engineering projects to be run on microcomputers. They find that use of personal computers results in large personnel productivity gains and that the smaller outlays for hardware are very cost-effective.

Thus, while traditional word processing, spreadsheet, and database functions continue to account for most microcomputer usage, creative engineers are capturing the power of the microcomputer for innovative engineering applications. If their enthusiasm for these machines is any indication, more and more microcomputers will soon find homes in engineering departments.

Incidentally, since this is our education issue, we asked what sort of career opportunities were available. Kearfott (1 Hughes Pl., Little Falls, NJ 07424) and Link (Binghampton, NY 13902), we were told, are always on the lookout for bright programmers and engineers. Half their employees fall into the engineering category, and a quick glance at salaries, benefits, and expansion plans indicates a thriving company. The Personnel Departments will be more than happy to look at resumes from *Creative Computing* readers. ■

Ace Flies Again

I've flown against Fokkers in Microsoft *Flight Simulator* and MiGs in MicroProse *F-15 Strike Eagle*, but neither prepared me for this mission on a Link simulator. Without radar or a wingman, I must shoot down an advanced F-18 jet fighter—with a single engine Cessna airplane.

Even worse, I am in a replica of a real cockpit, with yoke, throttle, rudder pedals, and a myriad of dials. This is certainly a far cry from a set of cursor keys or a joystick.

With blue skies above and green fields below, the engine drones on as I crisscross no man's land. Suddenly, a flicker of light catches my eye—sunlight reflecting off an F-18—and a spurt of adrenalin jolts me into action.

I throw the plane into a diving corkscrew. As I pull out, the tail of the F-18 appears just ahead of me.

I stalk him. Like a shadow I stalk him, all the while lining up the crosshairs on his tail. I fire. The rocket streaks toward the target, but the red glare comes from my eyes as the rocket explodes below the enemy. I yank back the yoke, pulling up the nose of my aircraft, and fire again. The rocket arcs toward the plane. My eyes trace its path. The enemy starts to turn. And in that brief instant of achievement, when time stands still, the rocket destroys the intruder.

Thumbs up. Mission complete.

FOR COMMODORE 64

MAKE NO MISTAKE...

CALKIT for your Commodore 64 is a powerful, real-world problem solver. Faster, easier and more accurate than pencil, paper and calculator – and a lot less frustrating.

CalKit helps you solve household and small business problems that involve rows and columns of numbers.

- balance your chequebook in seconds
- plan your home or business budget with ease
- simplify your income tax, and your investment portfolio
- calculate loan or mortgage payments, and then find out what happens to them in seconds, when interest rates change

That's the real advantage – with CalKit, you can change any number in your equation, and see how it affects the other numbers. All calculations are performed instantly! CalKit gives you the answers, in the time it takes to ask "What If...?" You can make projections and plan ahead with confidence!

The CalKit problem-solving package includes built-in templates for the most important home and business needs. Over 20 ready-to-use, real-life applications on one disk. The rows, columns and calculations are already defined. No need for time-consuming initial set-ups – all you do is enter your data. Other CalKit features, like on-screen menu and simple commands, make it even easier.

An easy and comprehensive manual with tutorials on each application are included. You'll be using CalKit like a pro, right out of the box. And once you've mastered the built-in templates, you'll be ready for your own unique spreadsheet programs.

Powerful solutions + ease of use + low low cost = CalKit. It all adds up to exceptional value, for a computer program that can help you every day.

BATTERIES INCLUDED

"The Energized Software Company!"

WRITE FOR A FULL COLOR BROCHURE

186 Queen St. West
Toronto, Ontario,
M5V 1Z1 Canada
(416) 596-1405

17875 Sky Park North,
Suite P, Irvine, California
USA 92714

©1984 Batteries Included. All rights reserved. Commodore is a registered trademark of Commodore Business Machines, Inc.

Scrolling down Fifth Avenue.

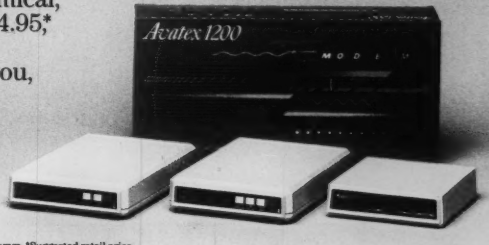
Step beyond the limits of personal computing, and through the doors of the world's finest stores. Or right into the action on Wall Street. Browse, buy, sell or trade. Stocks, information, Maine lobster, Oregon seedlings, Italian luggage, airline tickets. Without leaving your chair.

With an Avatex™ modem, your personal computer can take you wherever you want to go, on your schedule. As far, as fast, as often as you like, at a price that won't stop you in your tracks.

Avatex gives you the power, speed and intelligence of a serious piece of communications equipment, streamlined so anyone can use it easily and productively. Immediately.

So with Avatex the possibilities are astronomical, but the price of owning one is not: Avatex 300—$64.95,* Avatex 600—$99.95,* Avatex 1200—$299.95.*

For the name of the Avatex dealer nearest you, call 800-4-AVATEX.



Avatex™ Modems

The next step in personal computing.

Avatex™ is a trademark of E+E DataComm. U.L./C.S.A. & FCC Part 15 and 68 approved. Copyright 1985 by E+E DataComm. *Suggested retail price.

CIRCLE 119 ON READER SERVICE CARD

TELECOMMUNICATIONS TALK

The Reader's Guide goes electronic

Corey Sandler

As a writer, I've had a lifelong love affair with words and books and magazines. The perfume of my youth was the musty odor of the backshelves of libraries.

There were rainy Saturdays when I would read the encyclopedia for entertainment, or browse through the *New York Times Index* for 1938, or pore over the latest newsprint edition of the *Reader's Guide to Periodical Literature*. By age 13 or so, I was on intimate terms with both the Dewey Decimal System and the batting averages of the entire Los Angeles Dodgers roster.

(In adulthood, I fulfilled one of my deepest fantasies when I dated the children's librarian in the town where I was working. And I can still remember the unknowing jealousy I saw in the eyes of some of the fourth graders when I came to pick up L.S. after work.)

And now I am a writer in a world where most of my words are created without benefit of paper, and where some of them never make contact with printer's ink. There's a certain loss of tangible accomplishment when all that I can show for a day's work is four entries in my MCI mailbox. Sometimes I make printouts just so I can have something to point to.

However, the electronic world works both ways. (Full duplex, you might say.) More and more of the world's stored intelligence is becoming accessible to computer users at work and home. I can consult hundreds of newsletters over NewsNet; I can read from thousands of technical papers and journals on BRS; I can look up a term or a name in an encyclopedia on The Source, and I can find out everything I ever wanted to know about a company's finances from Dow Jones.

And now my old friend the *Reader's Guide to Periodical Literature* has joined the electronic world. Publisher H.W. Wilson Company, one of the hoary veterans of database technologies (they called them indexes way back when) has put the *Reader's Guide* and 11 of its other offerings on the computer.

H.W. Wilson is the descendant of the lifelong work of one Halsey William Wilson, who was, according to *The Saturday Review*, to "bibliography what Webster is to dictionaries, Bartlett to quotations."

Halsey William Wilson was to "bibliography what Webster is to dictionaries, Bartlett to quotations."

Old H.W. started his company in 1889 at the University of Minnesota, when he and his roommate bought a printing press and began printing syllabi for professors and selling books. The small business developed into a bookstore, and Wilson determined that his biggest problem in serving his customers was the lack of a database (err, index) of available books and publishers.

In 1898, Wilson began publishing a monthly listing of new and recent books, calling it the Cumulative Book Index. Entries were listed by author, subject, and title in the same index, an organization that was unique at the time. Wilson also found a way to update his database quickly. Since entries consisted of lines of metal type, Wilson treated each line as if it were a card in a library catalog. New entries were inserted among the earlier lines of type.

The CBI was a success, selling a respectable 300 copies at $1 each in its first year.

Librarians also began to sign up, and in 1901, Wilson added the first issue of *Reader's Guide to Periodical Literature*, indexing seven magazines.

One policy started by Wilson and continued to this day involves a spreading of the economic burden among libraries large and small, rich and poor. Clients were billed on the basis of the amount of use a library could make of a publication. Larger libraries paid more, in other words.

In November of 1984, Wilson's company went electronic with Wilsonline. When last I checked, they were offering the following indexes on line:

- Applied Science and Technology Index, indexing every article in 336 periodicals on aeronautics, space science, chemistry, energy, engineering, marine technology, meteorology, petroleum and gas, physics, robotics, telecommunications and more;
- Biological and Agricultural Index, with listings from 204 English-language publications in life sciences with coverage of agriculture, animal husbandry, biology, botany, genetics, cytology, zoology and more;
- Business Periodicals Index, indexing 304 publications;
- Book Review Digest, with excerpts from and citations to more than 6000 reviews of current adult and juvenile fiction and non-fiction each year;
- Cumulative Book Index, with listings of between 50,000 and 60,000 books each year with full library information including author, title, subtitle, subject, cross-reference, illustrator, price, publisher, and other information;
- Education Index, covering 354 periodicals, yearbooks, and monographs;
- Index to Legal Periodicals, indexing 476 different legal journals, with author, bibliographic, and subject entries, and subdivisions for topical and geographical categories;

Which electronic mail service delivers much more than mail?

Every one of these electronic mail services does a very good job of delivering the mail.

But only one delivers so many more online services with equal expertise.

The Source.

With The Source, you can have the daily news delivered along with your daily mail. Make airline reservations. Trade stocks. Hold a computer conference. Communicate with thousands of people who share your interests.

Even get the latest word on new hardware and software products, in seconds.

All this, and more, along with the electronic mail service called "the most powerful available anywhere."

And all for just $49.95, plus reasonable hourly usage fees.

Call 800-336-3366* and you can have the power of The Source working for you in a matter of minutes.

Or for more information, visit your nearest computer dealer or mail the coupon below.

Please send me more details about The Source.

Name Telephone #

Address

City State Zip

☐ ☐ I own a personal computer
yes no

Mail to: Source Telecomputing Corp.
1616 Anderson Road
McLean, VA 22102

7814710

INFORMATION NETWORK

The Source℠

The most powerful resource any personal computer can have.

The Source is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. The source services are offered in participation with Control Data Corporation © Source Telecomputing Corporation, 1985. MCI Mail is a service mark of MCI Communications Corp. EasyLink is a service mark of Western Union.

*In Virginia or outside the continental U.S. call (703) 821-6666.

COMMUNICATIONS
SourceMail℠
Mailgram® Message Service
PARTICIPATE™ Computer Conferencing
CHAT Interactive Communications

NEWS & INFORMATION
News Bulletins
UPI News Service
Associated Press
Scripps-Howard News Service
Accu-Weather™
The Washington Post Electronic Edition
Sports
BYLINES Feature News

INVESTOR SERVICES
Portfolio Management
Delayed Stock Quotes
Real-Time Stock Quotes
Spear Securities Online Trading
Media General STOCKVUE
Donoghue Investment Newsletter
INVESTEXT Research Reports
Management Contents Publication Abstracts
Employment Services
UNISTOX Market Reports
Commodity World News
BIZDATE Business Magazine

PERSONAL COMPUTING
MICROSEARCH™ Hardware, Software Reviews
Member Directory
POST Bulletin Boards
Member Publications

TRAVEL SERVICES
Official Airline Guide
A-Z Worldwide Hotel Guide
Travel, Hotel Tickets & Reservations
Restaurant Guides
Travel Tips, Tours

SHOPPING & LEISURE
Movie Reviews
Comp-u-store Electronic Shopping
Games, Educational Quizzes

CIRCLE 157 ON READER SERVICE CARD

• Readers' Guide to Periodical Literature, including 186 magazines, *Creative Computing* among them;
• Library of Congress/MARC;
• Journal Directory File;
• Publisher's Directory File, and
• Name Authority File.

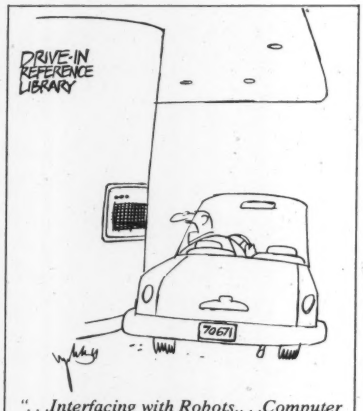
The database searching procedures for Wilsonline are quite complete, and a bit complex. Searches can include Boolean Operators (and, or, and not); various truncation symbols for wildcard searches, and searching using qualifiers based on more than 25 elements of listings. For example, books can be searched on the basis of the author's name, the ISBN number, the Library of Congress number, the Dewey Decimal number, the publisher's name, and other categories.

In coming months, the rest of the Wilson indexes will come on line: Art Index; Bibliographic Index; Biography Index; General Science Index; Humanities Index; Library Literature, and Social Sciences Index.

As mentioned, old H.W. would feel right at home looking at the pricing schedule for Wilsonline; many libraries would also understand it right away. It took a mere mortal like me a bit of time, but basically the schedule has four different classes of subscription and ten discount rates.

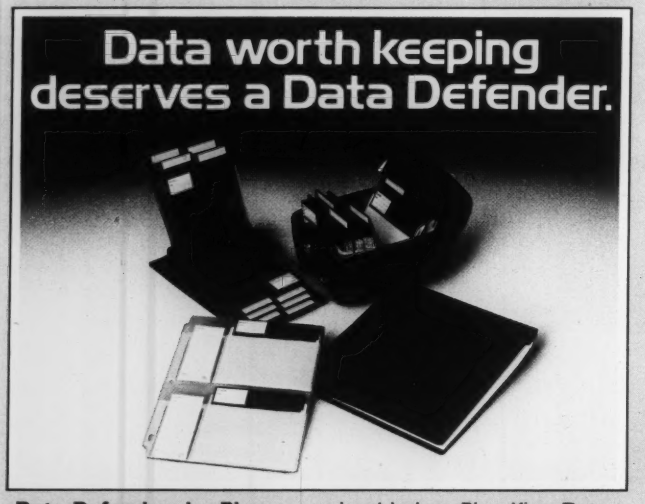
The lowest charge—from $32 to $50 per hour, depending upon which index is being consulted—goes to institutions or individuals who are already subscribers to the printed index being searched. The highest rate, $65 per hour, is charged to non-subscribers to any Wilson product. You can bring down the price by paying into an account in advance of use—putting $2400 down drops most rates by as much as $10 per hour. Access to Wilsonline is through Tymnet or Telenet, and any capable telecommunications program should work. Expect to pay an additional $8 or so per hour for telecommunications.

Wilsonline maintains a toll-free phone number for information about its services. The number is (800) 367-6770. In New York State, call (800) 462-6060. The mailing address is: H.W. Wilson CO., 950 University Ave., Bronx, NY 10452. ■



". . .Interfacing with Robots,. . .Computer Peripherals, Systems Programming, and Advances in Artificial Intelligence Technologies. . ."

Data worth keeping deserves a Data Defender.



Data Defenders by Ring King. They're the finest quality protection you can buy for the information you have stored on 5¼" mini-diskettes and printout.

The Ring King 070 Tray holds 70 mini-diskettes in a tough copolymer shell with security lock. The Ring King Flip File II binder holds 20 mini-diskettes and converts to a desktop index. Ring King Looseleaf Files are punched to fit standard 3-ring binders. Ring King Data Binders hold up to 8" of 9½" x 11" or 14⅞" x 11" unburst printout.

Ask for Ring King Data Defenders at your computer supply dealer. Or send for our free, full-color catalog of computer support products. Write Ring King Visibles, Inc., 2210 Second Avenue, P.O. Box 599, Muscatine, Iowa 52761. For customer service, phone (800) 553-9647, in Iowa (319) 263-8144.

DATA DEFENDER™

Ring King®

CIRCLE 177 ON READER SERVICE CARD

The Wraps Are Coming Off. What's New At...

You'll Like What You See!

- ☐ New products — new features
- ☐ System enhancements for expanded efficiency
- ☐ More and more new databases
- ☐ Advanced laser videodisc technology
- ☐ New people — new facilities
- ☐ A whole new slant on information

BRS

BRS • Rt. 7 • Latham • NY 12110
(800) 345-4BRS

CIRCLE 159 ON READER SERVICE CARD

A truly portable MS-DOS computer from one of the oldest companies in the field

Morrow Pivot

David H. Ahl

The Morrow Pivot is a compact, totally portable MS-DOS computer with single or dual 5 1/4" floppy disk drives, 16-line LCD display, built-in modem, and serial and parallel ports. Both the user interface and manuals—particularly the Owner's Handbook—are exceptionally friendly, reflecting in large part the friendly but no-nonsense attitude of company founder and president, George Morrow.

On the opening page of the Owner's Handbook, we read, "If you're someone who holds manuals in contempt as a matter of principle, at least familiarize yourself with the contents of the first section. It's short, and there are lots of pictures." With an opening like that, how can Pivot miss?

What You See

In contrast to the almost universal use of light beige or gray on computers today, the Pivot is an ominous flat black. An adjustable black carrying strap hooks to the top so you can more easily heft this 9.5 lb. unit. It measures 13" wide by 9.5" high and 5.6" in depth closed or 13" open (keyboard folded down).

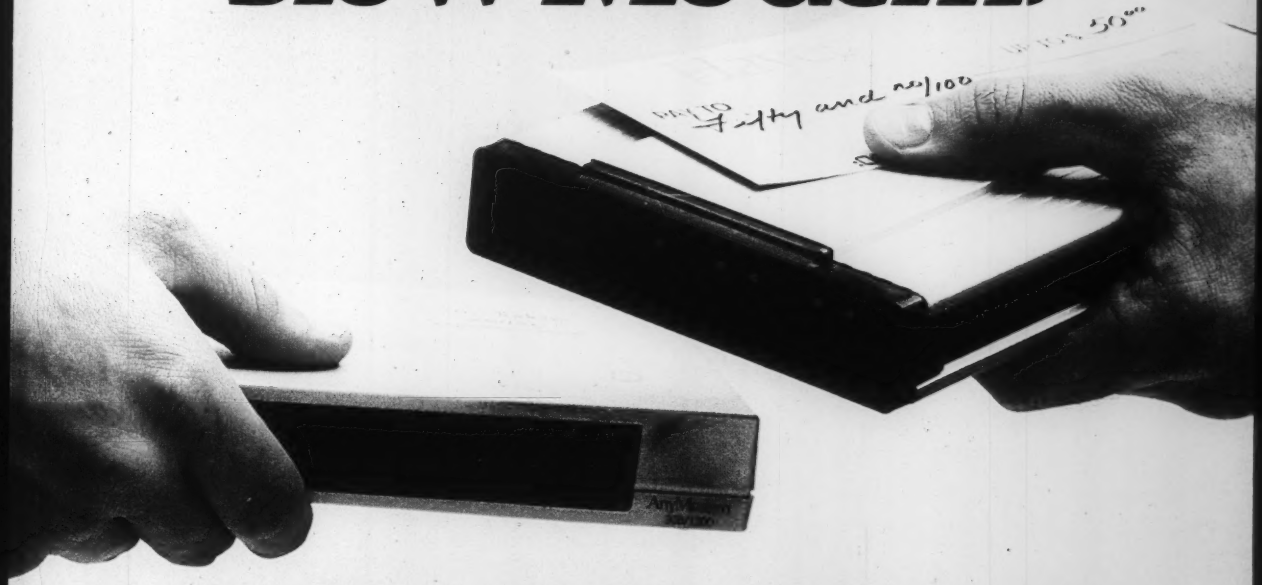
On the left side, we find a battery pack compartment, on/off switch, AC adapter connector, and LCD viewing angle dial. On the back are a serial RS-232 connector, parallel printer connector, and modular phone jack. The right side houses one or two disk drives. The AC adapter is not one of those little 9-volt battery eliminators, but an industrial duty (15 volt, 2.5 amp) power supply about the size of a small cigar box. The rechargeable battery pack itself is also a monster, although that is to be expected for a battery that will be powering one or two 5 1/4" disk drives. Battery life is said to be about four hours (depending upon use of the disk drives) and recharge time is eight hours.

The keyboard has 62 full-stroke keys. The action and feel of the keys are

Hardware Profile

Name: Morrow Pivot **Type:** Portable computer **CPU:** 80C86, 3.33 MHz
RAM: 128K expandable to 640K **Ports:** Parallel, serial, telephone
Keyboard: 66 keys, 14 pressure sensitive function/icon keys
Display: LCD, 16 lines x 80 characters; 480 x 128 pixels
Disk Drives: One (or two) 5 1/4", 360K **Modem:** 300 baud direct connect
Battery: Rechargeable, four-hour life **Dimensions:** 13" x 9.5" x 5.6", 9.5 lbs.
Documentation: Six user's guides and manuals **Operating System:** MS-DOS
Bundled Software: MS-DOS and Utilities, NewWord
Summary: Truly portable MS-DOS computer with 5 1/4" disk drive and modem; operating system overlaid with several nifty extras.
Price: 128K, 1 drive $1995; 256K, 2 drives $2895; 640K, 2 drives $3695
Manufacturer: Morrow
600 McCormick St.
San Leandro, CA 94577
(415) 430-1970

Fast Cash For Your Slow Modem.



During Hayes Modem Trade-Up Days Now through April 30, 1985

If your old modem is costing you too much in time and telephone charges, now's the time to trade up to the industry leader–Hayes Smartmodem 1200™ (operates with the IBM® PC and many other personal computers, including Macintosh™) and Hayes Smartmodem 1200B™ (plug-in board modem for the IBM PC and compatibles).

Cash saving rebate.* During Hayes Modem Trade-Up Days, bring in your old modem (any speed, any make) to a participating dealer. And Hayes will send you a cash rebate when you purchase a new Smartmodem 1200. If your used modem is a Hayes, we'll send you $50; if it's some other brand, we'll send you $25. It's that simple.

What's more, we've just reduced the price of Smartmodem 1200 and 1200B, so you'll actually save two ways!

Get on-line with the leader. Don't miss this special opportunity to dramatically increase the speed and performance of your communications. While cashing in on some great savings from Hayes, the telecomputing leader.

Call right away for the name of your nearest participating dealer. And get fast cash for *your* slow modem.

1-800-255-2550 (In the Continental U.S.). (Call 1-800-447-0890 in Alaska and Hawaii). Remember. Our modem trade-up offer is only good through April 30th. So call today.

Hayes®
Innovative products for enterprising people

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, Georgia 30092

***The promotion is available only through participating dealers in the U.S. and Canada. Please allow 4 to 6 weeks delivery for rebate check.** Smartmodem 1200 and Smartmodem 1200B are trademarks of Hayes Microcomputer Products, Inc. Macintosh is a trademark of Apple Computer, Inc. IBM is a trademark of International Business Machines Corp. © 1985 Hayes Microcomputer Products, Inc.

CIRCLE 125 ON READER SERVICE CARD

virtually identical to the Model 100. Also like the Model 100, the keyboard lies practically flat; we had no trouble typing on it, but people who like a sloping keyboard will not be enamored of it. Because there are fewer keys than many other MS-DOS machines boast, many of the keys on the Pivot do double duty when coupled with the SHIFT or CONTROL key.

Above the keyboard is a touch panel with ten function control keys (F1 to F10) and four icon keys. These icon keys are unique to the Pivot, and most of them function without booting a disk or MS-DOS. When you turn the computer on, the display shows a calendar page with the date and time on the left and a world map on the right. If you are working on something else, the Clock/Calendar icon will return you to this opening display. From it you can check the time in a foreign time zone—a handy thing for that occasional phone call to Europe or Tokyo.

The Modem icon turns the Pivot into a terminal for calling databases like The Source and CompuServe or other computers. After you enter a phone number, the Pivot dials it automatically.

The Calculator icon activates a ten-key calculator, the display of which pops up in a window to the left or right of the screen. This is a four-function, 16-digit calculator with a few added goodies (compared with a pocket calculator). For example, you can set the number of decimal places, you can ask for rounded or truncated answers, and you can swap the sign of an entry.

The Diskette icon will automatically boot a disk. It is also used to return to a disk-based program from the clock/calendar or calculator mode of operation. Another use of this function key is to scroll the display—a feature required when you use software designed for a 25-line display on the 16-line display of the Pivot. Essentially, the 16-line display becomes a window on the full-screen 25-line display.

Speaking of the display, it measures 9" x 2.4", a much higher width to height ratio than a standard CRT. Characters are formed within a 5 x 7 pixel matrix with one pixel between letters horizontally and vertically. Descenders on five lowercase letters occupy the horizontal space, a common practice on LCD screens but one that definitely does not enhance readability. For graphics, a matrix of 480 x 128 pixels is dot addressable.

The front bezel is scored for a 25 line x 80 character LCD screen, and the manual mentions it in several places. Presumably it is coming in the future, but for now only 16-line models are being delivered.

The LCD screen has a fixed tilt of 20 degrees, satisfactory for some room lighting conditions, but not others. We eventually propped the front of our Pivot on a book to give the screen a tilt of 32 or so degrees which we found a considerable improvement. We understand from Morrow that in the future the Pivot will be shipped with a backlighted screen. This should lead to excellent legibility at the standard tilt angle.

Morrow is not a giant in the industry, but it is a sensibly managed company that has managed to survive for ten years.

What You Don't See

The heart of the Pivot is an 80C86 CMOS true 16-bit microprocessor operating at 3.33 MHz. It ran our standard Basic benchmark in 26 seconds—about 30% slower than desktop PC clones running at a clock speed of 4.77 MHz.

The basic Pivot is equipped with 128K of RAM and can be expanded to 640K. Internal ROM, which includes the icon software, is 16K. A small portion of the RAM (up to 16K) which contains the time of day, date, appointment calendar, and phone directory is permanently backed up with a small built-in battery said to have a two-year life.

The double sided, double density disks are formatted to the nine sector-per-track IBM standard and hold 360K each.

The Pivot comes with a 300 baud, auto dial, direct connect modem built in. If you want more speed (1200 or 2400 baud), the serial port is configured for connection to an external modem. The Pivot software cannot handle an external modem for file transfer; the manual advises buying a separate software package such as *Crosstalk* or a modem/software package combination.

What You Get

The Pivot comes in a big box which contains, in addition to the computer itself, MS-DOS and *NewWord* disks, a 178-page Owner's Handbook, a Microsoft MS-DOS User's Guide and Programmer's Reference (a rare inclusion—great for systems programmers, meaningless to end users), a Microsoft Debug Utility manual, a monster (400+ pages) *NewWord* User's Guide and 55-page supplement, a four-page instruction sheet on how to set up *Lotus 1-2-3* for the Pivot, and a free membership form for the on-line Official Airline Guide (saves $50).

The version of MS-DOS included with the Pivot is 2.11. The disk includes 16 utility programs such as Diskcopy, Link, and Format. We found we could also load standard IBM PC-DOS and MS-DOS (Compaq flavor) but not everything would work correctly; thus we recommend you stick with the furnished disk.

We had problems running several PC packages, some because of the 16-line display. Others such as *Electric Pencil* (which has run on every clone to date) just hung up the machine completely. On the other hand, by following the provided instructions we got *Lotus 1-2-3* to run without a hitch. However, you cannot view graphics on screen. The only way you can get a graph is to define it and save it with /GS, and then print it on a printer or plotter with the PrintGraph program.

NewWord is a word processing package written by some MicroPro defectors. It is similar to *WordStar* in concept and execution, but it has many advanced features. If you like *WordStar*, you'll love *NewWord*; if you hate *WordStar*, you might be neutral about *NewWord*.

NewWord has four levels of on-screen help. You probably won't be happy with the highest (default) level since it takes up nine of the 16 lines of the display, but the others are very helpful.

NewWord supports a wide range of printers and lets you, with some small difficulty, use all the custom print features of whatever printer you have connected. It prints mailing labels according to any conditions you specify such as a range of zip codes or all addresses except Newark, NJ. Conditionals can also be used for inserting selected paragraphs (for example, insert paragraph 3 if &PET& = dog).

Neither IBM Basic or BasicA (GW Basic) runs on the Pivot. However, Basic

HARNESS THE FULL POTENTIAL OF YOUR HOME COMPUTER

You can increase your knowledge and harness all the power your home computer system has to offer with CREATIVE COMPUTING PRESS' IDEABOOKS. If you're an owner of an Epson HX-20, TS 1000, TRS-80 Model 100, Commodore 64, Texas Instruments or work with Microsoft Basic, you'll find an IDEABOOK written for you!

Each IDEABOOK helps you discover your computer's hidden strengths and overcome its weaknesses! As soon as you open to chapter one, you'll begin to get more out of your system with:

- 50 tested, ready-to-run programs that will help you solve everyday problems in math, science and business.
- Problem solving formulas with repetitive trials, convergence, recursion, compounding, probability, simulations, geometry, science and drill and practice.
- Ways to identify any shortcomings and targeted applications that are best suited for your system.

Supplement your user manual with the IDEABOOK that's just right for you! Gain the knowledge and confidence you need to make the most of your system—ORDER YOUR COPY TODAY!

ONLY $8.95 EACH

For faster delivery, PHONE TOLL FREE
9 am–5 pm E.S.T.: 1-800-631-8112 (In NJ only: 201-540-0445)

Also available at your local bookstore or computer store.

CREATIVE COMPUTING PRESS
Dept. **FNIF**, 39 East Hanover Avenue, Morris Plains, NJ 07950

Please send me the following books:

Title	Book No.	Qty.	Price Each	$2.00 Postage & Handling Each	Total Price
Epson HX-20 Ed.	3S		$8.95		
Texas Instruments Home Computer Ed.	3R		$8.95		
Timex-Sinclair 1000 Ed.	3P		$8.95		
TRS-80 Model 100 Ed.	4A		$8.95		
Microsoft Basic Ed.	67-4		$8.95		
Commodore 64 Ed.	68-2		$8.95		
CA, NJ and NY State residents add applicable sales tax					
Total Amount Due					

Payment Enclosed $_____ Outside USA add $3.00 per order.
Purchase orders $50 minimum.
Charge My: ☐ American Express ☐ Visa ☐ Mastercard

Card No._____ Exp. Date_____

Mr./Ms./Mrs._____
(print full name)

Address_____

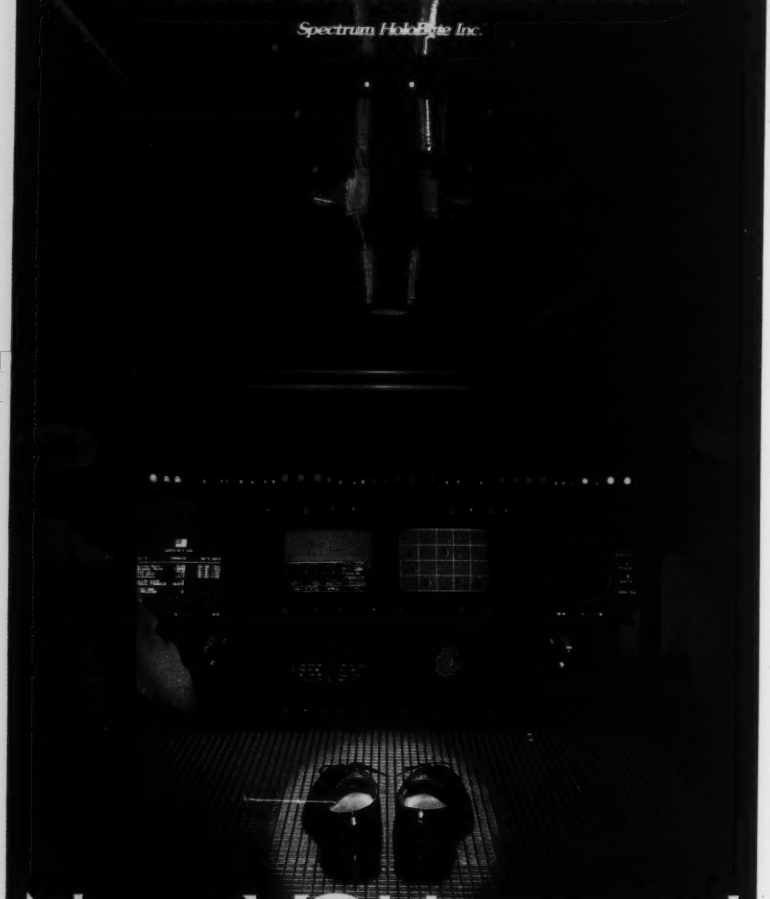
City/State/Zip_____

☐ **Please send me a Free Creative Computing Press Catalog.**

GATO™

WW II GATO-Class Submarine Simulation

Spectrum HoloByte Inc.



Now YOU step in!

IBM PC Series (Inc.PCjr)
128K RAM
One Double-Sided Disk Drive
COLOR Graphics Adapter
Graphics Monitor
(RGB recommended)

APPLE //e and //c
128K RAM
One Disk Drive
Joystick Optional
(64K, 80 column cards
available for $199.95)

SPECTRUM HOLOBYTE, INC. 1050 Walnut, Suite 325, Boulder, CO 80302 (303) 443-0191. Check your local computer store or wherever software products are sold. Dealer Inquiries call: (800) 621-8385 x 262. Written by Paul Arlton and Ed Dawson. Suggested retail $39.95. IBM and Apple are registered trademarks of International Business Machines Corp. and Apple Computer, Inc. respectively.

for the Compaq (and, we assume, other clones) runs without any problems. Curiously, Basic disables certain of the built-in functions such as Prt On (echoes the screen to the printer), Page Up, and Page Down, but not others. For example, the Print Screen, Home, Calculator, and Window Scroll keys worked fine. Frankly, we can't see much need for the deleted functions; it just seemed strange that they didn't work. Although the Basic graphics commands work, we recommend not using them as the high width to height ratio of the screen coupled with only 16 lines produces some unwanted effects.

With the Pivot, as with any other computer, our standard caveat holds: be sure to try out the software packages you want to use and see if they run before you buy.

Should You Get One?

Is a Pivot for you? Pros: it is truly portable, has 5 1/4" disk drives, runs MS-DOS, has a nifty icon touch panel, and is state-of-the-art without pushing unproven new technologies. Cons: the LCD screen is not suitable for certain lighting conditions (although the backlighted screen will fix this), 16 lines require compromises when running software designed for 25 lines, and not all PC software runs on the machine.

Morrow is not a giant in the industry, but it is a sensibly managed company that has managed to survive for ten years—a commendable feat in an industry where three years seems more the norm. The company has a good reputation with customers and dealers alike; this bodes well for continuing support of the Pivot even though, incidentally, it is not manufactured by Morrow.

Should you get one? If you need its capabilities, it's the best buy in town. ■

CIRCLE **409** ON READER SERVICE CARD

CIRCLE 155 ON READER SERVICE CARD

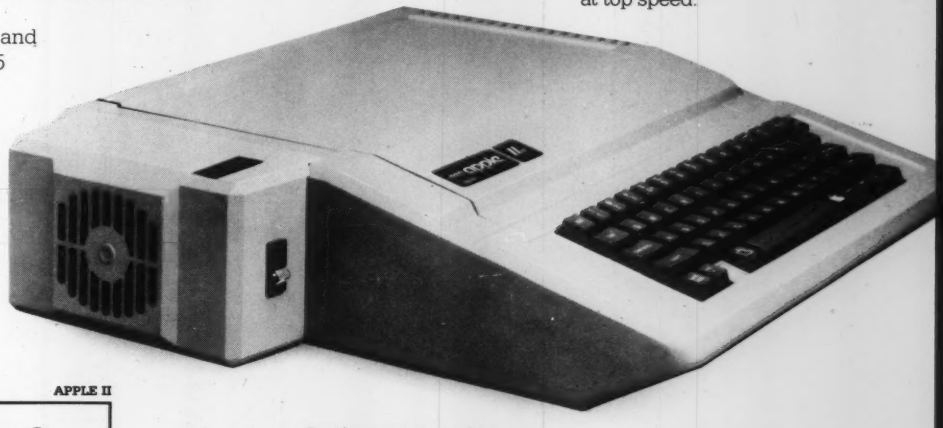
What made over 100,000 Apple II owners fall in love with System Saver?

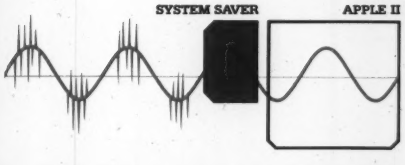
It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

System Saver® filters out damaging AC line noise and power surges.
70-90% of all microcomputer malfunctions can be traced to power line problems.* Problems your System Saver guards against.

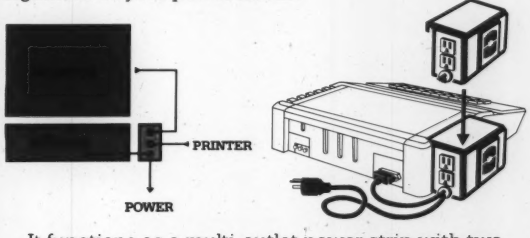
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.





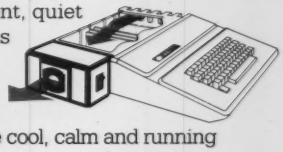
System Saver makes your Apple more convenient to use.
No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.



It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

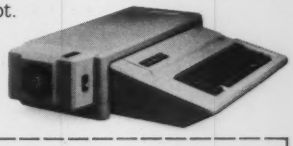
System Saver lets your Apple keep its cool.
Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.



So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand



Please send _____SYSTEM SAVER(S), $89.95 each. Total $_____
Include $2.50 for shipping and handling.
New York State residents add applicable sales tax.
☐ Check enclosed ☐ Visa ☐ Master Card

Card No. Expires

Name on Card

Name

Address (UPS delivery)

City State Zip Phone

251 Park Avenue South
New York, NY 10010
(212) 475-5200 Tlx: 467383 KML NY

KENSINGTON™ MICROWARE

*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

System Saver is a registered trademark of Kensington Microware Ltd.
© 1984 Kensington Microware Ltd. System Saver is patent pending.

CIRCLE 134 ON READER SERVICE CARD

A 68000 muscle machine that also does some pretty good impressions

Dimension

John J. Anderson

It is a fact: everything *is* bigger in Texas. That does, of course, include aspirations. For some time now we have reported on the aspiring Texan component of the microcomputer industry, represented by leaders such as Tandy, TI, Houston Instrument, Datapoint, and others. In a land where hats often take ten gallons and airports are sometimes five miles long, aspirations stand tall. And the aspirations of the Dimension 68000, from Micro Craft of Dallas, represent a tall order indeed.

Dimension 68000: Big footprint; big wallop, too.

Hardware Profile

Name: Dimension 68000
Type: Desktop microcomputer
CPU: Motoroloa 68000
RAM: 256K expandable to 512K
Operating System: emulates MS-DOS, Apple DOS 3.3 and Pro-DOS, CP/M, Unix (using coprocessors)
Ports: Serial, parallel, joystick, NTSC video output, six peripheral slots
Display Resolution: Up to 100 x 50 in text mode, 320 x 525 graphics mode
Keyboard: Detached 83-key fullstroke
Documentation: Good. System, UniBasic, CP/M 68K and C user manuals
Summary: Less than thrilling as an emulation machine, but an extremely powerful 68000 machine for the programmer or engineer
Price: $3900, with dual drives, main 68000 CPU, 256K; $5500 with 512K and three coprocessor cards
Manufacturer: Micro Craft Corporation
4747 Irving Blvd., Suite 221
Dallas, TX 75247
(800) 527-7605

Candide's Computer?

Imagine a micro that was the best of all possible worlds. Basically a 68000-based muscle machine, it would represent sheer computing power. And built around co-resident coprocessor boards, it would also optionally run IBM MS-DOS software, Apple II software, CP/M software, and Unix-based software. You wouldn't have to choose between standards. That decision would no longer be necessary. There would be no reason to buy another machine.

That, in a nutshell, is the philosophy of the Dimension 68000. There is, however, more to this machine than merely a nutshell, as we shall see. But first the specifics. The Dimension system includes 256K RAM, expandable to 512K, dual half-height, single density, double sided drives, CP/M 68K, based on the 68000 CPU, Basic, a C Compiler, 68K assembler, diagnostics, and utilities. It comes with an NTSC output, a Centronics standard parallel port, an RS-232 standard serial port, and a joystick port.

Ten-Gallon System Unit

As one might guess, a system unit designed to enclose a 68000 along with a maximum of four co-processor cards, while leaving room for at least two peripheral cards, is necessarily massive. The Dimension system unit is handsome, but sports a footprint that would dwarf many a desk. Available as internal options in this large case are 96 track, double density floppy drives, and either a 20Mb or a 50Mb hard disk unit. The system we received for evaluation was supplied with three co-processor boards (8086, Z80, and 6512), as well as a memory card that brought the system up to 512K. A big footprint, yes—and a big wallop, too. The Dimension is a Texas behemoth.

The keyboard is OEMed from Key Tronic and offers the same improved PC layout as the Key Tronic 5150 replacement for the IBM PC. This is an 83-key full-stroke keyboard with 10 function keys nestled on the left, a 10-key numeric keypad nestled on the right, and a modified Selectric-style keyboard in center stage. The keyboard is not as sturdy as the standard IBM keyboard, nor does it offer the same crisp tactile feedback, but it is completely serviceable, and includes LED caps lock readout, which the PC keyboard does not.

We got the Dimension up and running without any major problems, and

BEFORE YOU BUY A PRINTER, TAKE THIS SIMPLE EYE TEST.

This is from a leading computer printer.

This is from the new GE TXP-1000.

LETTER-QUALITY PRINTING. GREAT-LOOKING GRAPHICS.

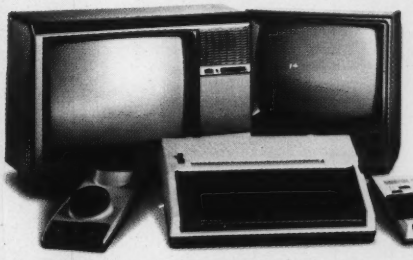
As you can see, the General Electric Printer is easy on the eyes. In fact, you'll have to look high and low to find a printer that gives you better quality printing and clearer graphics for the money. It has two speeds and uppercase and lowercase characters. It prints U.S., scientific and international characters in three widths, too. And it'll give you some of the sharpest and most-detailed graphics you've ever seen.

Watch. It's fast, flexible and quiet.

It's easy to see the versatility in the GE Printer. You'll get high-quality printouts at two speeds on virtually any paper. And it's quiet, too. So it's a silent partner for any computer.

See, it's compatible with Commodore, Apple, IBM, Atari.*

The GE Printer is fully compatible with most home computer systems. So it's easy to live with.



A full line of peripherals worth more than a glance.

Whether it's a GE Modem with direct or acoustic operation, a GE Computer Monitor/TV with resolution that offers superior text and graphics or even the GE Program Recorder, it'll be one of the best connections your home computer ever made.

Look, a full two-year warranty and toll-free number.

GE gives you a two-year warranty on its printer, and should you have any questions, you can always call the GE Answer Center,™ 1-800-626-2000 toll-free and get help right away. And all our peripherals are backed by General Electric's reliability and service. The GE Computer Printer. A beautiful sight.

We bring good things to life.

*Atari, IBM, Commodore, and Apple are registered trademarks of Atari, Inc., International Business Machines Corporation, Commodore Electronics, Ltd., and Apple Computer, Inc.

CIRCLE 115 ON READER SERVICE CARD

hooked it to a composite monitor using the standard RCA phono jack. (An RGB card is available as an option.) The display can be configured to 20 x 20, 40 x 24, 80 x 25, 80 x 50, and 100 x 50 rows and columns, respectively. Needless to say, the 100 column by 50 row display is not advisable on an NTSC monitor.

Does it Do Jimmy Stewart?

Before you can get the Dimension into emulation mode, you must patiently move some files around. This is a little tiring, but the process is documented clearly enough. Finally you end up with a system disk—the first disk to boot on the Dimension when out of native mode. This system disk contains the emulation software to tell the hardware which impersonation you wish it to do. So far so good—we told the Dimension to become an Apple, and there before us appeared a 40 x 24 all-uppercase display with no screen editor and the familiar > prompt. Very convincing!

But a funny thing happened to our video output on the way to becoming an Apple—the top half of it began to tear. By playing with the vertical hold, we got the image to stick, but it remained jittery, with an unsightly bend to the left. A call to Micro Craft got us a very nice, helpful response, unfortunately to the effect of "play with the vertical hold." This was slightly unsettling. We were assured, however, that this fault has been corrected in subsequent models.

Compatibility and Inability

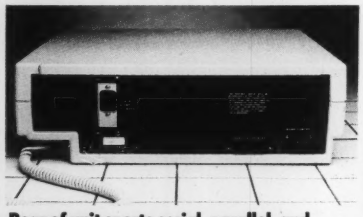
Then we started trying to load software. As has been my experience since the advent of work-alikes, compatibles, and emulators, some stuff works; some stuff sort of works; and some stuff just doesn't work. That's the way it is.

Such was also the case with IBM emulation. *Lotus* booted up, as did *WordStar*, and even *Flight Simulator*. A little further experimentation revealed that although *Flight Simulator* would boot, it didn't quite run correctly. We could not avoid backing up into Lake Michigan, no matter how hard we tried. Beyond that, not much else would even boot, and that which did ran only up to a point. We have determined time after time that copy protection is the worst foe of compatibles, and I believe it to be the culprit in this case as well. As protection schemes almost always reflect directly the very peculiarities of a given piece of hardware, they are by their nature the toughest conditions to emulate. That's the way it is.

On the CP/M front, things only got worse. I'll admit we don't have too much CP/M software lying around the lab anymore, but none that we did have would boot on the Dimension.

I was disheartened. The Dimension represents a valiant attempt to encompass the best of all possible software worlds, but does not really deliver on this promise. I placed a call to Don Bynum, head of the Dimension project for Micro Craft. I told him of my reservations and reminded him that for the price of a fully-blown Dimension, one could very nearly buy a full-blown IBM PC, with a full-blown Apple II, and a full-blown Kaypro CP/M machine. Sure, they would take up a lot of room, but at least you would know all your software would run. Why, then, opt for the Dimension?

Keyboard is equivalent to KeyTronic 5150.



Rear of unit sports serial, parallel, and mouse/joystick ports.

Well somewhat to my surprise, Don had some very plausible answers to that question. I soon realized that I might be going about my hardware evaluation from entirely the wrong perspective. Can the Candide angle. Go for Casey Jones.

Desktop Diesel

Don described the Dimension as a computing locomotive. He suggested that the unit should not be reviewed as an emulation machine at all, but as a high performance 68000 machine, that at the same time offers a link back to some older software bases. He put forth the case of an engineer, involved in modeling and simulation, who already uses an IBM PC or Apple II to aid him in his work—but all he can do currently with a micro is the "administrative" part of his job. He can write his weekly reports on it. He can do his project budgets on it, and he can sum up his data in some primitive ways with it. But he cannot do actual modeling with it, because it is not powerful enough. There simply isn't enough RAM, or more significantly enough CPU power, to take care of the actual job he has at hand.

Using the Dimension, that engineer can do the things he would otherwise need to timeshare on the VAX or other comparable mini or mainframe to accomplish. As an example, he can do a 1000-point Fast Fourier transform in double precision in something under 20 seconds, including a hi-res output of the waveform. So the muscle is undeniably there, and solely in the hands of the person at the desk. At the same time, our hypothetical engineer can also drop his IBM emulator card into the Dimension, and continue to use the *Lotus* or *WordStar* software that he has been using all along.

Data by Rail

Bynum emphasized that emulation on the Dimension is not an end in itself, but a bridge between existing datafiles and the world of the 68000. Using the Dimension in emulation mode, existing datafiles can be ported over from existing environments to the environment of the 68000 processor, without raising the prospect of rekeying. To a CPA, or a small businessman with dozens of existing data disks, the Dimension offers a reasonable means to enter the CP/M 68K or other heavy-duty 68000-based sphere, without scrapping the work that has led to the existing, large database. This is a critically important consideration to those who have reached the limit of their current systems, but abhor the prospect of a changeover because it would mean massive and costly amounts of busywork.

Around the Bend, Unix

Further, the Dimension offers Unix potential for the future. As it rather spooks me, I offered that Unix might be an anchor around the neck, though a dif-

ferent kind of anchor than CP/M had proven to be. Don agreed that CP/M had "set the industry back five years," but responded that rather than another anchor around the neck, he viewed the coming of Unix as a potential "time bomb in the pocket." He continued:

"I'm a Unix enthusiast, and I went to a Unix user's group meeting in Dallas recently. I would typify the people who went to that meeting as falling into two classes: there were a bunch of guys with beards and sandals, who looked as if they might be offended at the statement that Unix could be used for useful work. They have been experimenting with operating system theory in Unix for ten years now. All of a sudden, though, that group is shrinking. AT&T has budgeted $150 million dollars to convince the business world that they will need Unix. That is creating a group that expects real results. And that group is growing. I think Unix is the best alternative that is out there right now.

"It does have some heavy burdens that come with it, though. It is like the operating system on a big computer—it uses loads of overhead. Like a big computer operating system, there are lots of things that can make doing a big job easier, too. But like a big computer operating system, if you take any kind of a power hit in the middle of the day, the consequences can be pretty grim. It is not as bad as it used to be, however. A benchmark of this was the track record of Dimension Unix during fall Comdex. We demonstrated our Unix system there—we ran it all five days—and suffeed three power failures in our building during those five days. We lost exactly one file. I was astonished. The only guy who was more surprised than I was our Unix engineer. He was first surprised, second happy, and third wondering when and where the other shoe would fall.

"The key is that Unix offers an incredibly powerful development tool, and while the shell itself is far from user-friendly, user-friendly shells can be developed on top of it. That is what is beginning to happen. The Dimension is sitting above the PC AT and AT&T entries in terms of performance, because we're using the 68000 as opposed to the 80286, and we run Unix with two 68000s—one 10 Meg component that's actually running Unix and one that's acting as file server and handling the I/O stuff. This dual-processor arrangement squeezes the most out of the system."

With CP/M 68K, the Dimension is also well-placed in the single-user market. People who need a tremendous amount of computing power will have a tough time finding a bigger engine in a desktop micro. Bynum pointed out that there are four Dimensions being used at the Jet Propulsion Laboratory for heavy number crunching. As a result, JPL saved the cost of another minicomputer system.

Changing Pitch

Though he admitted that the Dimension was originally pitched as "the machine for all software," the emphasis that Don now underscores is the Dimension as a superlative 68000 machine, with the plus that in emulation mode, lots of other stuff can run. "There is an attraction, I suppose," he said, "to the fact that with a straight face you can say that the Dimension is a machine that will run most of the software across the range from the Apple II to Unix. That's a pretty grand statement. But I don't know anyone who really wants to run most of the software across the range from the Apple II to Unix. Maybe a magazine editor like you, or someone like (industry and software analyst) Portia Isaacson. I hope Portia doesn't get mad at me, because we're old friends. But I can't name anyone else who is in a position to really want to do that kind of thing. And that's not where we're at."

I have to admit, Don had me there. For my less than typical needs, I would have welcomed the Dimension as the "universal" software machine. At the same time, I realize that there aren't a heck of a lot of other people in my position. I can't speak for Portia, of course (no one can do that). And from the point of view of an engineer, the Dimension is without question a powerful contender. Its benchmarks are unbeatable. Native mode Fortran and Pascal on the Dimension run rings around the IBM PC AT.

For sheer power, the Dimension is a winner. Space limitations preclude the inclusion of a comprehensive list of Dimension-compatible software packages, but you can download a list from the Creative Computing SIG or request one from the manufacturer. ■

CIRCLE **410** ON READER SERVICE CARD

RETAILERS TAKE NOTE

Create an educated and aware customer with *CREATIVE COMPUTING!* Every issue brings your customer new ways of using their microcomputer PLUS it's a "silent salesperson," helping users select new peripherals, software and hardware. If you're interested in a low ticket item that's efficient, effective *and* profitable, call us today! CALL 212-503-5380!

Or write: Ziff-Davis Publishing Company
Retail Sales Department
One Park Avenue—4th Floor
New York, NY 10016

When integration isn't enough

Concurrent PC DOS

Chris Terry

Integration of several functions in one software package is a concept that has more than come into its own during the past year. Many popular "integrated packages" allow you to insert figures from their spreadsheet and database members into reports and letters prepared on their word processing members. But what if you need a more powerful word processor than an integrated package offers, or what if you want to include figures from an engineering program in your spreadsheet?

In those cases and many others like them, you must change concepts. You abandon "integration" and adopt "concurrency" or "multitasking." You look for a system that will let you run the programs of your choice "concurrently"—which is exactly what Concurrent PC DOS from Digital Research is designed to do.

Concurrent PC DOS is a multiuser, multitasking system that allows you to run up to four PC DOS or CP/M programs simultaneously. It can be used by one or two users, one who uses an IBM PC keyboard and display and a second who uses a dumb terminal connected via the serial port.

Hardware Requirements

The minimum hardware requirements are 256K of memory and two floppy disk drives. This configuration is sufficient to get the system up and running, and perhaps to run a single application program that is not too memory-hungry. However, it is quite inadequate to take advantage of the windowing capabilities or to use the multitasking feature.

DRI recommends at least 512K of memory, one or two floppy disk drives, and a hard disk; a hard disk configuration needs at least 1.2Mb of space, partitioned for CP/M.

The operating system occupies 150K, and each application program (window) starts at 64K; this brings the count to 406K when running four programs simultaneously. However, some care must be taken in allocating memory, since some programs (such as word processors and spreadsheets) claim all available memory for use as data buffers.

Installation

Installation of Concurrent PC DOS on a system with two floppy disks, or on an XT, is straightforward, and the instructions in the manual are clear.

If you have an XT, it is recommended that you back up all files on the hard disk, since you may have to reformat it with both a PC DOS and a CP/M partition. If your hard disk is an add-on (such as Tecmar or Tallgrass) you may encounter even more complications, since the hard disk installation program will not run unless the appropriate disk drivers are available to it. If you are not thoroughly familiar with the technical details of your system, you will need expert help for this type of installation.

Windows

You can simultaneously run programs in each of the four possible windows, although there are a few restrictions. You cannot, for example, run more than one program that uses BasicA. And, although you can reduce window size to display two, or even three, windows simultaneously, the usefulness of this feature depends upon whether the application programs will support it. Many applications, not designed for multitasking, bypass the operating system during screen updates and may try to write over the full screen, spilling into other windows. The DRI applications, however, are designed for multitasking and do not create this problem.

Software Profile

Name: Concurrent PC DOS
Type: Operating system
System: IBM PC/XT **Format:** Disk
Summary: Easy to use multitasking system with excellent menus
Price: $295
Manufacturer: Digital Research, Inc.
160 Central Ave.
Pacific Grove, CA 93950
(408)649-3896

Utilities

Several system utilities are provided with Concurrent. FDMAINT and HDMAINT are formatters for use with floppy and hard disks, respectively; HDMAINT also allows the establishment of both a CP/M and a PC DOS partition on the hard disk. Another utility preempts part of main memory for use as a RAM disk, although the usefulness of this depends on how many windows you normally use at one time. It will speed things up if no more than two programs are to run simultaneously, but even 640K would hardly be enough for four programs and the RAM disk.

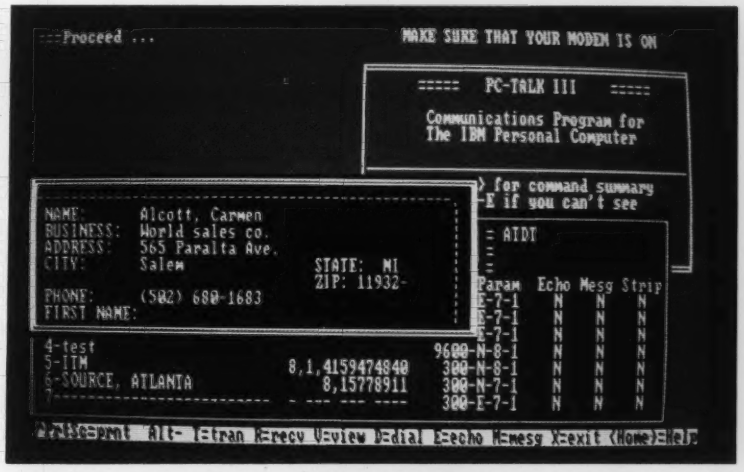
A really useful utility allows you to define up to 50 function keys for each window; it is somewhat like the CP/M-80 utilities *SmartKey* and *MagicKey* in that a single keystroke can represent an entire string.

The PRINTMGR print manager utility allows you to define a printer for each window, and provides print queuing of up to 255 files. It can be activated interactively from a menu or by command-line entries. One valuable feature is that for each window you can specify the number of copies to be printed, the printer to be used, and standard formatting parameters.

Three application programs are provided with the system: an editor, a communications package, and a simple database.

Editor

DR EDIX is a full-screen editor that supersedes the infamous ED and PC DOS EDLIN (which is nearly as bad as ED). DR EDIX creates straight ASCII


:::Proceed ...
MAKE SURE THAT YOUR MODEM IS ON
===== PC-TALK III =====
Communications Program for
The IBM Personal Computer
for command summary
-E if you can't see
NAME: Alcott, Carmen
BUSINESS: World sales co.
ADDRESS: 565 Paralta Ave.
CITY: Salem STATE: MI
ZIP: 11932-
PHONE: (502) 680-1683
FIRST NAME:
= ATDT
Param Echo Mesg Strip
4-test 9600-N-8-1 N N N
5-ITM 8,1,4159474840 300-N-8-1 N N N
6-SOURCE, ATLANTA 8,15778911 300-N-7-1 N N N
300-E-7-1 N N N
Alt- Ietran Mrecv Vview Mdial Eecho Mmesg Xexit (Home)Help

files with a carriage return/line feed at the end of each; lines may be up to 255 characters long and are numbered by DR EDIX internally, the current line number being displayed at the bottom right of the screen. DR EDIX allows you to work with four different files at once, each in its own buffer; a marked block of text can be moved within the same buffer or to one of the other buffers, to allow calling up boilerplate material.

The cursor can be moved left or right by character, word, or line, and up or down a line at a time. A scroll command moves the cursor up or down one page. Insert and overtype modes are both provided, and global find/replace commands are also available.

DR EDIX is not in any sense a word processor, but is a clean, simple editor for writing source code or simple letters and memos.

Communications

DR TALK is a versatile communications package containing all the features generally needed in communicating with other computers or bulletin boards and time-sharing services. It can upload and download both ASCII and binary files, using either its own protocol or the XMODEM (Christensen) protocol. For use with mainframes and commercial services, the pacing feature is extremely valuable. This feature sends ASCII files a line at a time, waiting either for a fixed time or until a prompt is received from the remote station.

A dialing directory can hold up to 60 names and phone numbers; each entry specifies the parameters to be used when communicating with the station.

Database

I did not have an opportunity to exercise CARDFILE, but it is a simple name/address/phone/comment database similar to a card file. Searching for a name is linear, either displaying all cards in sequence, or going directly to the required name.

Conclusion

Concurrent PC DOS is easy to use, considering its power, and is flexible in that it can run both CP/M-86 programs and PC DOS programs. The menus are excellent, because they give you enough information to do exactly what you want, yet don't hold up the expert user and infuriate him by making him go through several levels of menu. Besides, the real expert can always escape from the menu system altogether and work entirely at the system level with its cryptic prompts and complex command lines. But for the novice, or the person who only rarely uses some of the features, the menu system has one enormous advantage: at any time you can call up on-line help files to clarify details of the current operations available.

In performance, Concurrent is as fast as PC DOS and on a hard disk system is not noticeably slowed by running more than one program. The only trouble is that many applications are just not designed for multitasking systems and may not work well together. I have no doubt, however, that with the advent of more multiuser, multitasking systems such as IBM AT, many of the bestselling application programs will be updated to remedy the incompatibilities. ■

CIRCLE **408** ON READER SERVICE CARD

MAC/APPLE /IBM

APPLE

	Retail	Your Price
CBS		
Mastering the SAT	150.00	120.00
Krell		
SAT	300.00	240.00
HBJ		
Computer SAT	79.95	64.95
Howard Soft		
Tax Preparer 1985	250.00	199.95
Mecca		
Managing Your Money	200.00	160.00
Broderbund		
Karateka	34.95	27.95
Print Shop	49.95	39.95
Graphics Library	24.95	19.95
Monogram		
Dollars & Sense IIe	100.00	79.95
Dollars & Sense IIc	125.00	100.00
Forecast IIc	59.95	47.95

IBM

	Retail	Your Price
Mecca		
Managing Your Money	199.95	159.95
Infocom		
Hitch Hikers Guide to Galaxy	39.95	31.95
Human Edge		
Mind Prober	49.95	39.95
Simon & Schuster		
Typing Tutor III	49.95	39.95
SEI		
Spanish	39.95	31.95
French	39.95	31.95
Broderbund		
Ancient Art of War	49.95	39.95
CBS		
Mastering the SAT	150.00	120.00
Krell		
SAT	300.00	240.00
Howard Soft		
Tax Preparer 1985	295.00	236.00

MACINTOSH

	Retail	Your Price
Creative Solutions		
MacForth Level II	249.95	199.95
Videx		
Calendar	59.95	47.95
Mac Vegas	59.95	47.95
Assimilation		
Mac Spell Right	89.00	72.00
Mac Memory Disk	29.95	23.95
Turbo Touch	129.95	103.95
Soft-Tech		
MacAdvantage UCSD Pascal	299.95	239.95
Consulair		
Mac C with Tool Kit	425.00	340.00
Central Point		
Copy II Mac	39.95	31.95
State of the Art		
Electric Checkbook	79.95	64.95
Monogram		
Dollars & Sense	150.00	120.00
Forecast	69.95	55.95

In Bay Area Visit
SOFTWARE SOLUTIONS
11185 San Pablo Ave.
El Cerrito, CA 94530
Hours; 10 AM-6 PM

800-942-2058
In Calif. 800-223-8327
Hours 8 AM-6 PM PDT

For Technical Information & Order Status Call (415) 237-5283

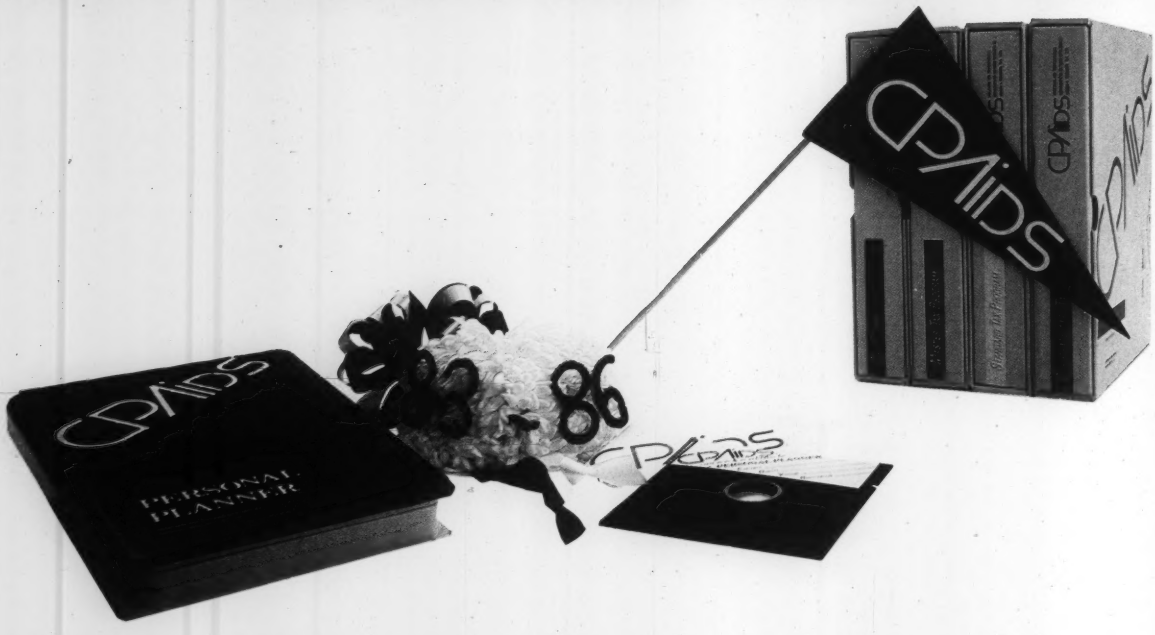
P.O. Box 1486
El Cerrito, CA 94530

For free catalog write to:
NONAGON SOFTWARE

CIRCLE 135 ON READER SERVICE CARD

Trusted by Accounting Professionals since 1978.

CPAids® Comes Home with the NEW PERSONAL PLANNER.



CPAids accounting software has been used and trusted by professionals since 1978. Now you can have much of this same expertise at home with the new CPAids Personal Planner. Priced at only **$49.** the Personal Planner will calculate your tax liabilities for the years 1983 thru 1986. Use it for retirement planning, investing, IRA contributions, home buying, two income planning and even checking your federal tax return.

The CPAids Personal Planner organizes your tax information, keeping your records readily available for instant evaluation. The Personal Planner was designed by CPAids programmers who have had years of experience programming for professionals. Although you'll get professional results, you don't have to be an accountant to get them. Requiring only 54 input fields, you get the maximum of output with the minimum of input.

CPAids Personal Planner calculates the following schedules and forms:

A	Itemized Deductions
B	Interest/Dividends
D	Capital Gains
G	Income Averaging
SE	Self-Employment
W	Joint Filing Status
4972	Special Ten Year Averaging
6251	Alternative Minimum Tax

CIRCLE 112 ON READER SERVICE CARD

Easy to use, the Personal Planner requires only a fifteen page documentation. A complete set of input sheets is also included. Available for the IBM PC, Sharp PC 5000 and other IBM compatibles. Also available on Apple II, the DEC Rainbow and other CP/M compatibles.

*CP/M is a trademark of Digital Research, Inc.; DEC Rainbow is a trademark of Digital Equipment Corp.; IBM is a trademark of International Business Machines Corp.; Sharp PC 5000 is a registered trademark of Sharp Corporation; Apple II is a trademark of Apple Computers, Inc.

CPAids, Inc. 1061 Fraternity Circle
Kent, Ohio 44240 (216) 678-9015

Help me reduce my taxes—Enclosed is my **$49.** for the Personal Planner. *Residents of Ohio add 5½% sales tax.

☐ My check is enclosed. Computer Type: _____

Name (Please print in full)

Street

City State Zip

( )
Telephone #

☐ VISA ☐ MasterCard Exp. Date: _____

Card #

Signature

Phone orders accepted for charges and C.O.D.

☐ Send me your FREE brochure on other CPAids Software.

Thermal dot-matrix print at a bargain price

Hush 80

Owen Linzmayer

Manufactured in the United States by Ergo Systems, the Hush 80 is said to be the lowest priced 80-column dot-matrix thermal printer currently on the market. Carrying a suggested list price of $139.99, the Hush 80 portable printer features 80-column bi-directional printing at roughly 80 characters per second, graphics at 4800 dots per square inch, and weight of only 25 ounces. The Hush 80 is offered in three models, each of which comes with a 100′ roll of thermal paper loaded and ready for use, and a 9-volt AC wall transformer with power cable.

Priced at $139.99, the Hush 80 CD comes complete with interface and cable for plug-compatibility with the Commodore line of computers. The Centronics-type parallel interface version, Hush 80 P, and serial RS-232 interface version, Hush 80 S, are both priced at $159.99 with the appropriate cables. Though all of the models are essentially alike, this review was based upon my experience with the Hush 80 CD.

The Hush 80 CD is an attractive little printer, and when we put the measuring tape to its cream colored body we find its dimensions to be 11.6″ x 5.5″ x 2.8″. Given its small size and light weight (36 ounces with a 100′, 8.5″ wide roll of thermal paper loaded), the Hush 80 CD is perfect for portable printouts; it was designed to fit in a conventional briefcase. Though it normally requires a 9-v DC transformer, the Hush 80 CD is available in a rechargeable battery-operated version for true portability.

Following the directions in the 37-page user's manual, set up of the Hush 80 CD is no more difficult than connecting the 6-pin DIN interface cable to the serial port on the Commodore and plugging the transformer into a wall outlet. The printer is turned on with the switch located on the left side of the unit above the power cord. Once activated, the linefeed button should light up, indicating that the printer is ready to receive data from the computer.

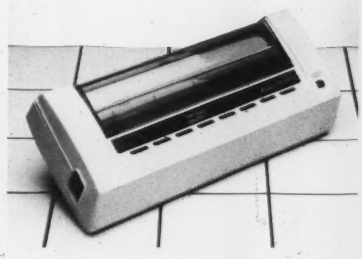
Incidentally, the linefeed button is the only mechanical control device on the printer. If you depress the linefeed button when you turn the printer on, you activate the self-test which results in a brief demo, along with a sample printout showing all of the features of the Hush 80 CD. In other cases, the linefeed button advances the thermal paper one line.

The manual contains Basic programming information needed to take full advantage of all features. As you can see in the sample output, the Hush 80 CD is capable of printing upper- and lowercase alphanumerics, as well as the complete Commodore graphics character set. In addition, you can design and print your own custom character set by entering the graphic mode. Using a printhead with a 5 x 7 matrix, the Hush 80 CD prints 40, 80, or 160 characters per line bi-directionally at an average rate of 80 characters per second. Graphics are printed uni-directionally on a 6 matrix. And as its name would have you believe, the Hush 80 CD operates very quietly (56dB).

There you have the specifications of the printer, but let's talk reality. The print quality is nice for a dot-matrix thermal printer, but you get what you pay for, and for $140 you shouldn't expect near-letter-quality output. What you do get is a very consistent, legible dot-matrix character set, though I was disappointed to find that the lowercase characters lack true descenders.

For a budding programmer on a budget, the Hush 80 CD is perfect since it has the ability to print all of the Commodore special graphics characters. Likewise, the battery-operated serial and parallel versions of the Hush printer are excellent for portable computer enthusiasts who desire draft quality 80-column output or can't afford the HP Thinkjet. However, if you are shopping for a printer for correspondence or other serious word processing applications, you will probably have to spend a bit more for a plain-paper impact dot-matrix printer. ■

CIRCLE **411** ON READER SERVICE CARD



Hardware Profile

Name: Hush 80 **Type:** Thermal dot-matrix
Feed: Friction **Speed:** 80 cps
Interface: Commodore, parallel, or serial
Density: 5 x 7 text
Graphics: 4800 dots per square inch
Character Sets: 2 **Buffer:** n/a
Logic Seek: Bidirectional
Summary: If money is an object, this may be the solution
Price: $139.99
Manufacturer: Ergo Systems, Inc.
26254 Eden Landing Rd.
Hayward, CA 94545-3718
(415) 786-3746

Hush 80 sample output.

Photography by Jeff MacWright.

A happy marriage of form and function

C. Itoh 7500EP

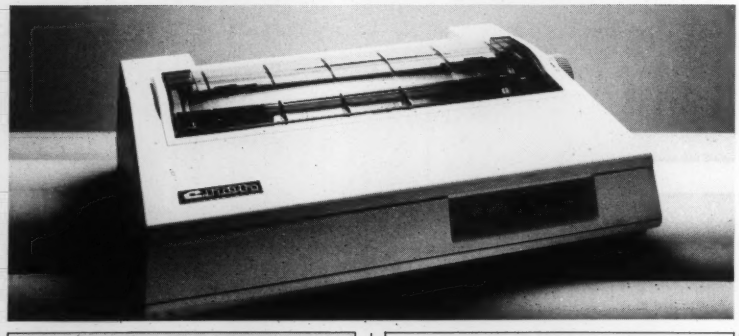
Owen Linzmayer

In the world of printers, the marriage of form and function is not always a happy one. Often one trait is compromised for another; leaving you with either a beautifully inoperative machine or an unsightly beast of burden. Such is not the case with the 7500EP dot matrix printer from C. Itoh. Recently reduced in price to a competitive $289, the 7500EP is one dot matrix printer that combines sleek good looks with uncompromised features.

Casting a critical eye upon the C. Itoh 7500EP, we see that it measures 14.9" wide, 4.4" high, and a foot deep. The 13.1 pound unit has a body that gently slopes down to a front control panel upon which several lights and switches are located. There are three lights that signal the status of the power, paper, and printer (on-line or deselected). Also found on this front panel are the linefeed (LF) and top of form (TOF) switches. Above this panel is the hinged cover of the printer that opens to reveal the printhead and paper loading mechanisms.

The 7500EP uses a precision 9-wire print head and a large multi-strike ribbon cartridge to produce text characters on a 9 x 11 matrix. Graphics are also available at up to 240 dots per inch. The position of the printhead itself can be adjusted in relation to the platen so that the 7500EP can accept forms up to three parts thick. Both friction and sprocket feed mechanisms come standard on the 7500EP, though my experience is that loading a single sheet of paper is a troublesome task. However, unlike many other low-cost printers, the 7500EP does not suffer the common problems of tearing fan fold paper and "eating" its own output.

The back of the 7500EP sports the power cable, two banks of DIP switches, and the parallel interface connector. (Note: the 7500AR is the RS-232C serial equivalent of the 7500EP, and at $329, costs a bit more. I know not why). Options available via DIP switch settings include carriage return followed by linefeed, form length (11" or 12"), line spacing, perforation skip, uni- or bidirectional printing, and line buffer size. As shipped from the factory, the 7500EP comes equipped with a 2K print buffer, and can be expanded.



Hardware Profile

Name: 7500EP **Type:** Impact dot-matrix
Feed: Sprocket and friction
Speed: 105 cps **Interface:** 8-bit parallel
Density: 9 x 11 normal text
Graphics: 240 dots per inch
Character Sets: 2 **Buffer:** 2K
Logic Seek: Bidirectional
Summary: Attractive features and price **Price:** $289
Manufacturer: C. Itoh Electronics, Inc.
5301 Beethoven St.
Los Angeles, CA 90066
(800) 423-0300
(617) 769-8770

The folks at C. Itoh claim that the 7500EP is fully compatible with the Epson RX-80 dot matrix printer, with the exception that the 7500EP is slightly faster (105 cps in normal mode) and somewhat cheaper. The 7500EP sports six different character pitches: normal, double width, compressed, double width-compressed, sub- and superscript. It also has double strike and emphasized modes (see sample printout).

In addition to enjoying the variety of text modes, I've had little difficulty obtaining beautiful screen dumps using graphics programs configured to think the printer is an RX-80. For the most part I have found the Epson compatibility claim to be substantiated.

This is the C. Itoh
Normal Mode
Emphasized Mode
Double Strike Mode
Compressed Mode
Double-Wid
example of superscrip
example of subscript
Standard underlining

Sample printout from the 7500EP.

The printer self-test is accomplished by turning the power on while holding down the top of form (TOF) button. The 7500EP reacts by printing its entire character set over and over, until the printer is shut off. When the power is turned on while the linefeed (LF) switch is depressed, all data received from the host computer is printed out in hexadecimal form. This function facilitates troubleshooting of hardware and software problems. Two other self-explanatory amenities are the emergency print halt and the paper empty over-ride.

Though the 40-page user's manual that comes with the 7500EP could use a little revision to make it more comprehensible to the neophyte, it does an adequate job. The many illustrations and charts help you get the most out of this inexpensive dot matrix printer. The printer itself is a well-designed unit with a nice array of features and very attractive lines. Not only is the 7500EP easy on the eyes, its low price makes it easy on the budget. ■

CIRCLE **412** ON READER SERVICE CARD

Photograph by Jeff MacWright

Only from Topaz...

Line 2® Power Conditioners with PowerLogic® Control

The logical choice in computer-grade power

They're in a class by themselves.

Highly efficient and completely reliable, these microcomputer-based Line 2 Power Conditioners eliminate computer problems caused by power-line noise and voltage disturbances.

With exclusive Powerlogic control, our Power Conditioners are able to perform with exceptional speed and accuracy. An internal microcomputer monitors incoming power and instantaneously corrects overvoltages and undervoltages.

Harmful power-line noise is also eliminated. A built-in Ultra-Isolator® Noise Suppressor provides common-mode noise attenuation in excess of 2 million-to-one (126 dB).

Available in micro, mini, and mainframe models, Line 2 Power Conditioners feature computer-compatible design, durability and top performance.

Find out more about our new Line 2 Power Conditioners. Call us today at (619) 279-0831, or contact your local Square D distributor.

TOPAZ

Excellence in Computer Power

SQUARE D COMPANY

CIRCLE 161 ON READER SERVICE CARD

How to get all your

Now you can easily control even hard-to-manage facts and figures with the Assistant Series from IBM.

If you line up the right software, getting your ducks in a row is not only possible, but easy.

There's a program in IBM's Assistant Series to handle each of the most important jobs people are using personal computers for these days: spreadsheets, word processing and database management.

But unlike software programs that can't share information with other programs, the IBM Assistants work together as a team, as well as alone.

And unlike other programs that can be challenging to learn, all the complicated inner workings of these programs have been hidden from view. So using them is almost intuitive.

Filing Assistant is a database program that allows you to organize and store information in any format that suits you, and retrieve it instantaneously, according to your own specifications.

Writing Assistant is a word processing program that shows you on the screen just what your words will look like on paper. It helps correct misspelled words and even lets you insert forecasts or graphs from other Assistants into your text.

Graphing Assistant turns numbers into pictures. Like all the Assis-

*Planning Assistant available early 1985.
**IBM Product Center prices.

ducks in a row.

tants, it accepts information from the keyboard, or directly from Filing Assistant. So you can see what the bottom line looks like as a pie chart, a bar chart or a line chart. Or all three. In minutes.

*Planning Assistant** is a powerful new spreadsheet that replaces complex commands used in earlier programs with plain English (TOTAL instead of C21+D21+E21+F21+G21). It's smart enough to widen columns automatically to fit your entries. It will even fill in the blank after "Dec 85" with "Jan 86."

Then there's *Reporting Assistant*, to help you create customized reports (complete with totals, subtotals and averages) of your Filing Assistant data.

Every program in the IBM Assistant Series works with every computer, every display and every printer in the IBM Personal Computer family. And each program costs less than $150.**

Any authorized IBM Personal Computer dealer or IBM Product Center can give you a demonstration of the Assistant Series. Just seeing them in action may make you feel more organized. For the location of the store nearest you, call 1-800-447-4700. In Alaska or Hawaii, 1-800-447-8090.

IBM®
Personal Computer Software

CIRCLE 127 ON READER SERVICE CARD

Little Tramp character licensed by Bubbles Inc., s.a.

1985 Winter Consumer Electronics Show

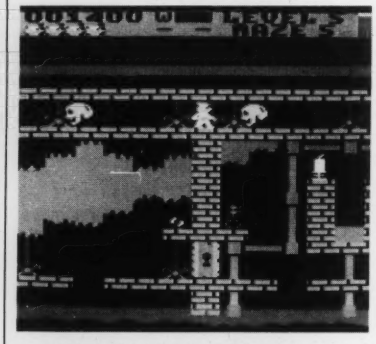
David H. Ahl

What was new at Winter CES? Everything under the sun from computers to robots to vaporware. We'll be reviewing many of the best products in coming months; meanwhile, here is a small smattering of hardware, software, news, views, and parties.

Commodore introduced the C128 computer with 128K of RAM, 80-column display, and CP/M-80 compatibility. Their double-page ads screamed "Bad news for IBM and Apple." We don't think so. Although the C128 is fully compatible with the C64 (means big software base), CP/M-80 is out of date, and you need a monitor to use the 80-column capability. We hear that Commodore wanted to price the machine at $399, took a look at the new Atari entries, and went back into a huddle. Best bet is a retail price around $250.

On the other hand, the LCD portable from Commodore looks like a potential winner. It has a 16-line by 80-character display, 32K RAM, 96K ROM, built-in modem, 72 keys, and built-in software including word processing, spreadsheet, file manager, Basic, and several other programs. Price: "well under $1000."

The most effective product demonstrators at CES? No contest. The kids, ages 8 to 14, who were demonstrating the line of games from **Epyx.** President Mike Katz, one of the best promoters in the business, happily stood back and let these youngsters steal the show. Ten new entries from Epyx include two dynamite games from **Lucasfilms;** a sci fi game (*Moreta: Dragonlady of Pern*); and high-tech versions of *Barbie, Hot Wheels,* and *G.I. Joe.* These last three games provide non-structured creative play for children four to ten years old.

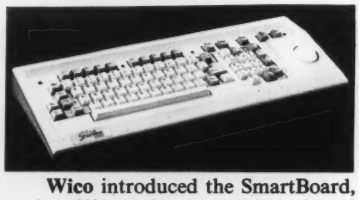


Woeful is the troll who doesn't act quickly in *Trolls and Tribulations,* a new strategy/action game from **Creative Software.** In the game, the player must lead trolls through treacherous underground caverns to recover treasures.

In *Break Street,* players guide game characters through such breakdancing movements as the tut, scorpion, windmill, and moonwalk. The DeRoxy Crew, a Seattle breakdancing group, consulted on the development of the game.

The first third-party Apple software company, **Muse,** was started by Ed Zaron eight years ago. Many ups and downs later, Ed is still going strong and has released his latest package (a C64 program!) *Smart Start.* Ed was impressed with the power of the C64 but felt that users needed a better way to get at its capabilities. *Smart Start* was the result, and it meets its objectives admirably.

Other Muse favorites include *Castle Wolfenstein, Beyond C.W., Three Mile Island* (unbelievably realistic simulation), *Robotwar, Super Text,* and many others.



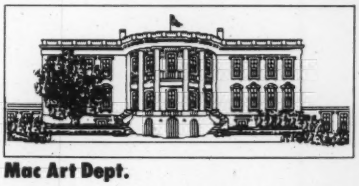
Wico introduced the SmartBoard, an intelligent keyboard/trackball peripheral for IBM PC and Apple II computers. Each of ten function keys can be programmed to contain as much as 126 characters of data, while the trackball can be used for cursor movement or mouse emulation.

Telelearning, a San Francisco based telecommunications firm, has announced several new college courses available to Apple, IBM, and C64 owners. Telelearning is a two-year old company that allows personal computer users to earn college credits at home by providing course material on disk and access to a college instructor by modem. To get final course credit, a student must take a proctored exam at a test center and apply for credit at one of the 2000 participating universities. Courses cost $35 to $200.

At the **Prentice-Hall** booth, *Skiwriter II* was being demonstrated by author Ken Skier, a former creative writing teacher at MIT who helped develop the highly-regarded Wang word processor. *SkiWriter II,* a friendly fast package has built-in telecommunications so that information can be downloaded from an on-line database and entered directly into wp documents. For the C64, PC, PCjr, and Apple; $69.95.

Most intriguing CES party: The **Infocom** participatory murder mystery staged by the New York based Murder-To-Go troupe. Guests were witness to various incriminating scenes and could examine the place where the body was found as well as police reports. Nine people solved the mystery, and the top winner won a trip to Bermuda.

Going for the big names is the strategy of **Simon & Schuster's** Electronic Publishing Group. Initial entries include computerized versions (for the IBM PC) of *J.K. Lasser's Your Income Tax* and *Your Money Manager, Webster's New World Spelling Checker, The Great*



Mac Art Dept.

International Paper Airplane Construction Kit (for the Mac), and a non-celebrity clip art program for the Mac, *The Mac Art Dept.*

Flyers' favorites: the new **subLogic** *Flight Simulator II* and **MicroProse** *F-15 Strike Eagle* games. The F-15 is fabulous with its radar and infra-red guided missiles, bombs, cannons, ECM, flares, and full aeorbatic capabilities. Cut in the afterburners and watch this baby move out! We hear that some fanatics have hooked two computers together and staged interactive dogfights. We didn't see any, but we did see a similar setup with the Nexa MSX flight simulator program. Very intense!

Electronic Arts displayed several new items including a Mac version of its *Financial Cookbook*, a *Racing Destruction Set* which allows players to design their own tracks and race cars, the *Adventure Construction Set*, and *Mail Order Monster* (a robot kit in which creatures can be designed and pitted against each other in three levels of combat).

PlayNet, a new company, offers a network for C64 owners. The net can be used for electronic mail, CB, transferring programs, and, most important, playing scores of on-line games. Current games include backgammon, checkers, chess, bridge, go, and eight more. The initial fee is $40, and there is a $6 monthly service charge.

Gamestar showed a line of highly realistic sports simulations including football, baseball, tennis, and a new one, auto racing. Unlike other racing games, *On-Track* provides head-to-head competition on any of ten famous raceways. Although you view the course from overhead, you still get non-stop racing action from start to finish.

*Q*Bert* is back in a sequel, *Q*Bert's Qubes*. In this game from **Parker Bros**, Q*Bert must hop from qube to qube and rotate them with his feet, while dodging Meltniks, Soobops, and the infamous Rat-A-Tat-Tat. 'Tain't easy!

Another sequel—to *Montezuma's Revenge*—is *Barbados Booty*, an undersea diving adventure. All 128 chambers in a maze of coral and sunken ships are infested with dangerous denizens of the deep—although there are many gems and valuable treasures scattered about as well.

Activision, once king of the Atari 2600 VCS game world but now a much slimmed-down company, was not showing a single 2600 game. An open letter from president Jim Levy says "We believe that 1985 is the beginning of a new era for home computers and home computer software . . . " (Well, whadaya know!) On the bright side, Activision was showing some of the most playable computer games on the show floor.

Stickybear, the hero and guide for the **Weekly Reader Software** learning programs came alive at the Winter CES. The funny, furry bear, created by the renowned illustrator, Richard Hefter, stamped his feet (danced?) to the music of the booth across the aisle and posed for photographs.

Niftiest product that will never reach the market: **Toki's** biometal robot. This miniature robot is controlled by a titanium-nickel alloy which "remembers" a shape or position. Heating the joints by a pulse current extends them, but when they cool, they return to their original shape and position. Toki was also showing an innovative light-driven interface that can control the robot or other motors and household appliances. We're rooting for you Toki, but . . . .

According to Cathy Carlston of **Broderbund**, sales of *The Print Shop* exceeded the wildest expectations of the company. And now, *The Graphics Library*, the add-on package of enhancements and fonts, seems to be pushing *The Print Shop* to new sales highs. We're happy to hear it—we loved *The Print Shop* when we reviewed it, and there are no nicer people in the industry than the Carlstons.

Third party software is quietly making the scene for the **Sharp** PC-5000. Sorcim released portable versions of *SuperWriter, SuperCalc2* (not 3), *SuperPlanner* and *SuperComm*; from I.U.S. come *EasyWriter II, EasyPlanner,* and *EasyComm;* MicroPro released *WordStar*; and Software Publishing released *PFS:File* and *PFS:Report*. In addition, one of the biggies in the Model 100 business, Traveling Software released their five major applications packs for the PC-5000.

MSX continues to be an enigma. **Microsoft** showed one each of all the currently available MSX machines from Japan and Korea, but no one was taking

orders. The official line was "wait until Summer CES." The machines creating the most excitement were those with interactive video capabilities (Pioneer, Sony, and JVC).

Heard from the top ad rep of a leading computer magazine at CES: "Five of the biggest companies here are living in glass houses. When the after-Christmas returns start coming back, they'll be down the tubes—or looking for a bailout." ■

Tom Adams

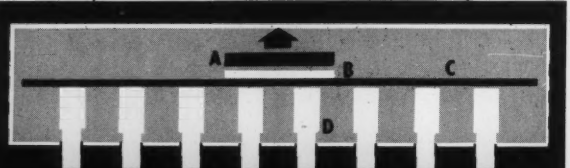
Using ultrasound to detect defects

Inside An IC

Once, long ago, you had your first glimpse of the inside of a computer. Someone lifted the monitor, removed the cover, and pointed to shiny black plastic rectangles with short silvery legs sitting on a green board. "That's the memory," you were told. And you took it on faith.

The thing about integrated circuits is that, unless you design and manufacture the things, you do pretty much have to take them on faith. Either they work or they don't. You can't repair an IC.

When an IC does fail, "overheating" is likely to be cited as the cause. ICs generate heat, and that heat must be dissipated. That is why your computer has vents and maybe even a fan. But even with an active cooling system like a fan, some ICs self-destruct. This is what manufacturers call "premature failure in service," and it has a great deal to do with the way ICs are made.



Side view shows heat path in an integrated circuit package. Heat is generated by the microcircuit at the top of silicon chip (A). A small amount of heat escapes upward through the plastic package (arrow), but the plastic is too good an insulator to allow much to escape. The best path by which heat can escape is downward through the bond layer (B) to the lead frame (C). Cracks, voids, and separations in the bond layer can block this route, causing overheating. Heat continues along prongs of lead frame, eventually traveling down the pins (D) into circuit board. Small amounts of heat are dissipated into the plastic along the way.

Physical Characteristics

The active part of the IC package is the chip itself, that precocious sliver of silicon. Also embedded in the black plastic package is the lead frame, a flat metal cut-out. In the center of the frame is a square called the "flag" from which radiate leads.

During manufacture, the chip is attached to the flag of the lead frame. This sounds innocent enough, but just *how* the chip is attached has profound implications for the future of the chip.

After the chip is in place, very fine gold wires are installed to bridge the gap between the relatively huge legs of the lead frame (which are the connections of the chip to the outside world) and tiny bond pads on the chip itself.

Next, the outer ends of the legs are bent, and the whole thing is encased in an extrusion-molded package of black plastic. The purpose of the plastic is to protect the chip from the environment—especially from moisture. The finished product is known as an IC package, or more technically a 16- or 40-pin plastic DIP (dual in-line package).

When the completed IC package is installed in a computer and power begins to flow through it, the chip begins to generate heat. The ordinary operating temperature of a chip is somewhere between 100 and 165 degrees C, depending on its particular use.

It is important to keep that temperature under control. As a rule of thumb, the life of the chip is cut in half for every 10 degrees Centigrade the temperature rises above normal. So the question becomes: how can heat be allowed to escape from the IC package?

Assembly

Let's take a close look at the IC package and the way it is assembled. One of the most important steps is the attachment of the chip to the lead frame. Typically, on the production line, a row of lead frames moves along a track, stopping first for a dab of silver-filled epoxy to be placed on the flag at the center of the lead frame, and then for the chip to be dropped on by a pick-and-place arm.

A good part of the future of your computer is determined at the moment the arm places the chip on the lead frame. Why? We'll see shortly.

When the package IC is put into service, the chip heats up, as mentioned above. Unless heat is removed from the chip and the package around it, the chip will fall victim to a condition known as "thermal runaway," in which increasingly higher temperatures destroy the chip.

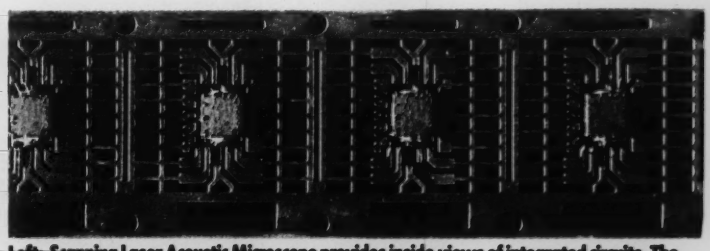
You might expect heat to escape upward from the chip. A small amount of heat does follow this route, even though the plastic in which the chip is encased is a mediocre conductor of heat. But the lead frame on which the chip rests is an excellent conductor. Even though there are many different kinds of plastic, of course, and different kinds of lead frames, too, the lead frame does offer the easiest route by which heat can escape.

But between the chip and the lead frame is the layer of epoxy that holds the chip in place. Sometimes solder is used instead of epoxy, but the problem is the same: both epoxy and solder are relatively poor conductors of heat. Heat from the chip will escape via the lead frame—but only if it can get *to* the lead frame.

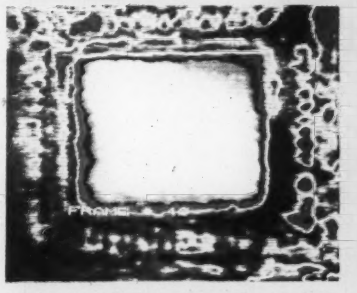
This is why the attachment of the chip to the lead frame is so important. The attachment material, whether it is solder or epoxy, needs to be as thin as possible (slightly more than a thousandth of an inch is typical) and as intact as possible. Several things can go wrong:

- The epoxy may crack as it shrinks and cures.
- Voids (actually bubbles) may form—especially in solder.
- The epoxy or solder may be separated (usually because of surface contamination) from the chip or the lead frame.

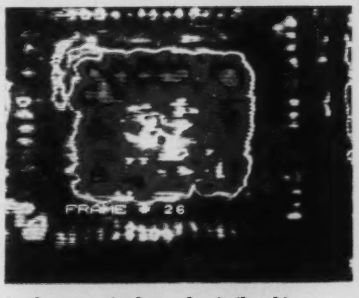
Any of these defects can keep heat from escaping from the chip. And once the chip is in place, defects are very difficult to detect and image with conventional detection technologies like x-ray. X-ray will spot a defect such as the complete absence of solder under part of a



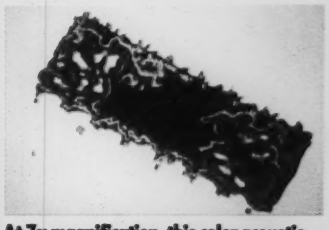
Left: Scanning Laser Acoustic Microscope provides inside views of integrated circuits. The IC goes on the stage near the technician's hand; note the red laser glow on the stage. Above: A close-up view of chips bonded to lead frames. Attaching the chip to the lead frame is a vital part of IC production.



A color acoustic photo of one chip attached to a lead frame. Magnification is about 70x. Flag and nearby regions of the lead frame appear green and orange, but the chip itself (including the bond layer beneath the chip) are white, indicating a good bond.



A color acoustic photo of a similar chip attached to a lead frame. This chip has definite bonding problems: the pink area is fairly well bonded; the green area, less so. The small red area at the center may not be bonded at all. Heat would not easily escape from this chip, and it would be likely to fail in service.



At 7x magnification, this color acoustic shot of an entire IC package shows blue and pink areas which indicate fairly good transmission; the structure of the lead frame is partly visible in these areas. But a large crack in the plastic package—the black-red area—covers the center of the IC, including the chip location. This package would probably permit lethal moisture to reach the chip.

chip, but doesn't usually reveal gaps.

Defect Detection

Detecting defects requires a new technology—specifically, acoustic micro-imaging. High frequency ultrasound is very sensitive to internal interfaces, and it is nondestructive. What happens is that the ultrasound is partly or entirely blocked by cracks, voids, separations, and the like.

The internal-feature photographs accompanying this article were made with the Scanning Laser Acoustic Microscope (SLAM, for short), made by Sonoscan, Inc. of Bensenville, IL. Properly termed acoustic amplitude micrographs, these photos show interior views of their subjects.

ICs (and many other objects) are opaque to light, but transparent to ultrasound. The SLAM transmits very high frequency upward through an IC, and a scanning laser "reads" the level of ultrasound that arrives at the top surface. A digital signal processor assigns a color to each level of ultrasound, and the full image is displayed on a color monitor.

All ICs, because they contain internal interfaces at the lead frame and chip, produce some sort of acoustic image. Ordinarily, the acoustic image of an IC with no unintended interfaces shows faint outlines of these features. The value of the SLAM is that it reveals *unintended* interfaces in an IC.

Virtually all IC manufacturers use electrical tests to weed out obviously bad ICs. Some also use a SLAM to image their ICs, either before or after they are encased in plastic. They look especially for anomalies in the bond layer. If a bond layer shows only a few tiny voids, it will probably pass, because the area of a void is what matters. Many tiny voids, a single large one, or a massive separation, will cause an IC to be rejected.

The SLAM also looks at the completed IC package. Here, bubbles in the molten plastic can form voids, and cracks can occur. Any defect in the plastic is potentially serious, because it can destroy the hermeticity of the package and allow moisture to reach the chip.

This isn't meant to be a horror story. Its purpose isn't to make you run to your computer and peek inside to see whether your ICs are sprouting delaminations, creeping with contaminants, or approaching thermal runaway. Most ICs work and keep on working. Manufacturers have developed lead frame and package designs which largely prevent overheating.

Computer stores expect most IC failures to occur during the first few weeks after the sale; these are the ICs with gross internal defects, and their replacement is generally covered by warranty. Most of the ones that survive the initial burn-in period will remain hale and hearty for the life of the machine. But if someday you do run across a dead IC, you will have a good idea of what caused its demise. ■

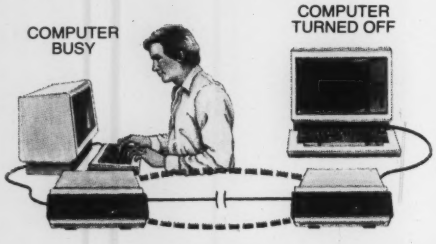
ProModem 1200... HOT-LINE

Our ProModem 1200 Makes Smart Modems Look Dumb

ProModem 1200
(RS-232)

ProModem 1200M
(Macintosh)

Send Or Receive 50 Pages Of Text Without Tying Up Your Computer



No wonder Smart Modems, Cats, and Maxwells cringe when compared to our $495 ProModem 1200, an expandable 1200/300 baud modem for use with all personal computers. It costs less, but is smarter than the rest.

And when you add our $99 Communications Buffer and Alphanumeric Display options, ProModem 1200 becomes a veritable genius!

Imagine, you unplug your computer, take it home for the weekend, and while you're gone, ProModem 1200 answers the phone, collects messages up to 50 pages long, sends out electronic mail, and displays all events with the exact time of each. Thanks to ProModem 1200, expensive, hard-to-use communications software isn't needed. The communications is in the modem, and electronic mail becomes a background function, where it belongs.

Simple To Install And Use

Our Communications Buffer is a 4 by 6 card that plugs into the ProModem 1200 motherboard. It comes with 2K of CMOS battery backed-up memory, expandable to 64K. Part of the memory is used as a dialing directory with the balance reserved for storage. For $99 more, a front panel Alphanumeric Display can be added to show time, date, and 24 status and help messages. These two powerful options can be included at time of purchase, or can be added later.

Hayes Compatible

ProModem 1200 is Hayes compatible but that's where the resemblance ends. Our standard $495 modem includes a real-time clock/calendar. Hayes charges hundreds more for a Smart Modem with a time-base. Nor do they have electronic mail capability at any price.

ProModem 1200 contains a battery backed-up real-time clock/calendar, a large dialing directory and can send or receive messages up to 50 pages long without tying up the computer.

Send for complete details and the name of the Prometheus dealer nearest you.

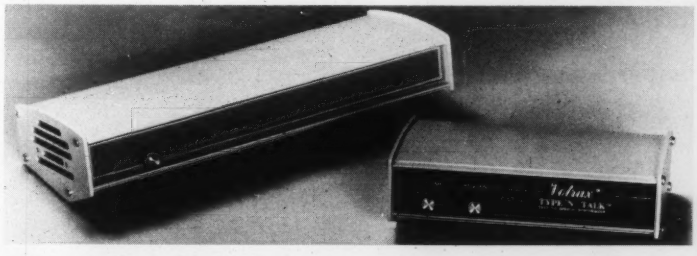
The Hot Line **PROMETHEUS**
PRODUCTS INCORPORATED
4545 Cushing Pkwy. • Fremont CA 94538

Call Now For Complete Info...
415/490-2370

CIRCLE 144 ON READER SERVICE CARD

What's New In Hardware

Russ Lockwood



Speech Synthesizers

Votrax has introduced two speech synthesizers for a wide range of computers, including IBM PC and compatibles, Apple II, Atari 400 and 800, TRS-80 Model I, II, and Color Computer, Commodore 64 and Vic-20, and any other computer with an RS-232C serial interface.

The Personal Speech System, built around a Z80 microprocessor and a special SC-01 CMOS speech synthesis chip, has 256 programmable frequencies and 16 programmable amplitude levels which can be adjusted to achieve various inflections. Votrax claims it is 95% accurate in translating computer data into conversational English. It includes a three-voice, eight-octave musical tone generator, an internal speaker, and a real-time programmable clock. The unit retails for $395.

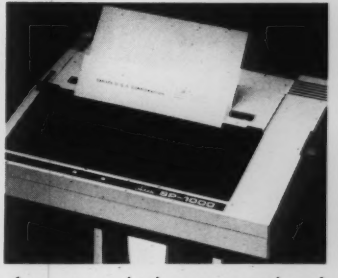
Type 'N' Talk, also built around the SC-01 CMOS speech synthesis chip, is a scaled down version of the Personal Speech System. Votrax claims it is 75% accurate in translating computer data into conversational English. It retails for $249.

Votrax
1394 Rankin
Troy, MI 48083
(313) 588-2050

CIRCLE **414** ON READER SERVICE CARD

Sakata Printer

Sakata, a manufacturer of monitors, has introduced the SP-1000, a 100 cps bidirectional dot matrix printer. It features 12 variations for

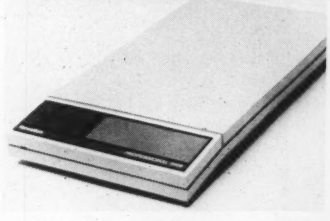


character printing, proportional character spacing, adjustable tractor and friction feed, and bit-mapped graphics printing at 5600 dots per second. The SP-1000 retails for $329.

Sakata
651 Bonnie Ln.
Elk Grove Village, IL 60007
(312) 593-3211

CIRCLE **415** ON READER SERVICE CARD

2400 Baud Modems



Novation has announced the Professional 2400 Communications System, a 2400 baud auto-dial, auto-answer modem for the IBM PC, Apple Macintosh, and AT&T 6300. It also provides 1200 baud and 300 baud communication, Hayes command language compatibility, and 327x/3770/3780 mainframe terminal emulation. The Mite communications software package is included. The modem sells for $795.

Novation
20409 Prairie St.
Chatsworth, CA 91311
(818) 996-5060
(800) 423-5419

CIRCLE **416** ON READER SERVICE CARD

Racal-Vadic has unveiled the 2400PC, an internal 2400 baud modem for the IBM PC, and the 2400V, an external 2400 baud modem for all computers with an RS-232C serial interface. Both auto-dial, auto-answer modems are also capable of 1200 baud and 300 baud communication and feature automatic switching between voice and data communication, pulse and tone dialing, and call-progress detection. The 2400PC and 2400V retail for $795 each.

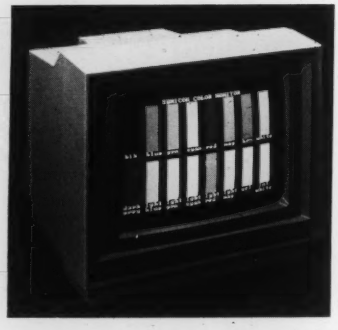
Racal-Vadic
1525 McCarthy Blvd.
Milpitas, CA 95035
(408) 946-2227

CIRCLE **417** ON READER SERVICE CARD

Sumicom Printer and RGB Monitor

Sunicom has announced the 1120, an 18 cps bidirectional daisywheel printer. A Centronics-type interface is standard, with RS-232C serial and 12-bit Qume Sprint 3 parallel interfaces optional. The 1120 accepts paper up to 13" wide, provides proportional spacing, and carries a suggested retail price of $495.

Sumicom also has introduced the 2120 Color Monitor, a 12" RGB



monitor with text resolution of 25 lines of 80 characters and graphics resolution of 600 x 200 pixels. The dot pitch is 0.38 mm. The 2120 retails for $499.

Sumicom
17862 East 17th St.
Tustin, CA 92680
(714) 730-6061

CIRCLE **418** ON READER SERVICE CARD

Bernoulli Box for Macintosh

Iomega has introduced the Bernoulli Box, a 5Mb storage system, for the Macintosh. The Box stores data on removable cartridges and offers access time of 50 milliseconds. The Bernoulli Box retails for $1895, with cartridges selling for $59 each.

Iomega
4646 S. 1500 West
Ogden, UT 84403
(801) 399-2171

CIRCLE **419** ON READER SERVICE CARD

IBM PC Reset Button

Security Microsystems Consultants has introduced PC Reset, a kit that allows users to install a reset button on the IBM PC. A module replaces a ROM chip, and the reset button mounts in an already existing hole in the rear panel of the system unit. PC Reset retails for $89.95.

Security Microsystems Consultants
16 Flagg Pl. Suite 102
Staten Island, NY 10304
(212) 667-1019

CIRCLE **420** ON READER SERVICE CARD

IBM PC AT Expansion Boards

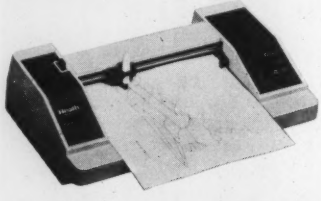
Profit Systems has introduced two expansion boards for the IBM PC AT. AT Power is a multifunction expansion board that holds up to 4Mb RAM and includes both serial and parallel ports. A second serial or game port is optional. The base configuration of AT Power, with 128K RAM, retails for $495.

Multigraph, a monochrome or color graphics adapter board, has monochrome resolution of up to 720 x 700 pixels and color resolution of 640 x 200 pixels. The base price of Multigraph is $499.

Profit Systems
4655 Old Ironsides Dr.
Suite 400
Santa Clara, CA 95050
(408) 748-9551

CIRCLE **421** ON READER SERVICE CARD

Plotter Kit



Heath has released the IR-5208 Digital X-Y Plotter, a $349.95 kit version of the one-pen Sweet-P Plotter. A $19.95 software support package, which includes a parallel interface cable, a tutorial, and four color pens, is available.

Heath
Benton Harbor, MI 49022
(616) 982-3210

CIRCLE **422** ON READER SERVICE CARD

Voice Input/Output Board

NEC America has released SAR-10 Voice-Plus, a voice recognition and audio response expansion board for the IBM PC. NEC uses a

custom chip with a 250-word capability to digitize spoken input. An ADPCM chip reproduces speech. The SAR-10 stores up to 65 seconds of audio response.

Utility programs allow users to integrate voice input and output into software. The SAR-10 carries a suggested retail price of $1495.

NEC America
8 Old Sod Farm Rd.
Melville, NY 11747
(516) 753-7000

CIRCLE **424** ON READER SERVICE CARD

Hard Disk Drive for Macintosh

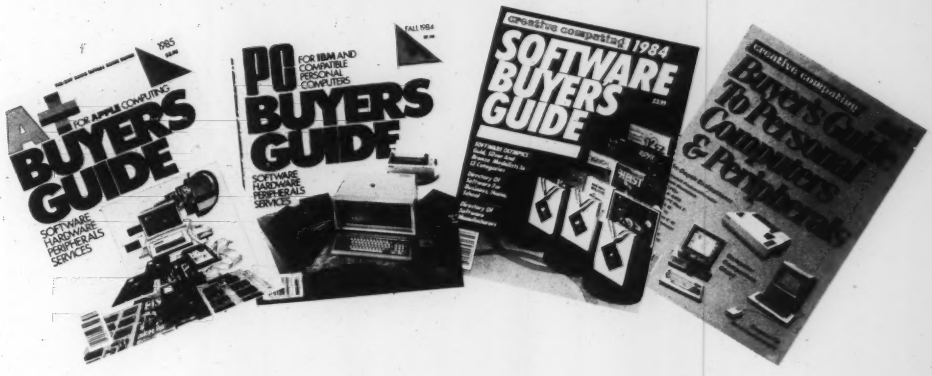
Corvus Systems has introduced the Omnidrive, a line of hard disk drives available in 5Mb, 11Mb, 16Mb, and 45Mb versions for the Apple Macintosh. Each drive comes with a 15' interface cable and appropriate system software.

Retail prices range from $1995 for the 5Mb model to $4995 for the 45Mb model.

Corvus Systems
2100 Corvus Dr.
San Jose, CA 95124
(408) 559-7000

CIRCLE **423** ON READER SERVICE CARD

THE WORLD'S MOST COMPLETE REFERENCE AND SOURCEBOOKS FOR MICROCOMPUTERS!



If you own or use a microcomputer, and you're in the market for new software, peripherals, and add-ons, you need current information that will help you make the right decisions at the right prices.

If you're new to microcomputing, you need a guidebook that will help you understand what's available on the market and what services will help you choose the right system at the right price.

No matter who you are, you need the guides and sourcebooks that both experts and beginners turn to—*you need a Ziff-Davis Computer Buyers Guide!*

A+ BUYERS GUIDE

For the most complete and current listing of over 3,000 software, hardware, peripherals, services and organizations for the Apple II series, III, Lisa and Macintosh! Published twice a year so it's always timely, A+ BUYERS GUIDE is the definitive source for Apple computing needs and services. $5.95.

PC BUYERS GUIDE

This is the reference guide for all IBM PC, PCXT, PCjr, PCAT and compatible owners and users. Published every 3 months, there is no other guide as complete or timely as PC BUYERS GUIDE! Updated quarterly to reflect the newest changes and innovations in IBM PC technology, PC BUYERS GUIDE brings you full listings on products, software, services, add-ons and compatibility requirements. $7.95

CREATIVE COMPUTING SOFTWARE BUYER'S GUIDE

A comprehensive buyer's guide to the leading software and application packages for Apple, Atari, Commodore, TRS-80, and IBM microcomputers. Complete listings, compatibility specifications and performance reviews covering over 1,000 business, education, personal and recreational programs and packages. $3.95

FOR FASTER SERVICE
PHONE TOLL FREE 1-800-631-8112
(In NJ only 1-201-540-0445)

CREATIVE COMPUTING BUYER'S GUIDE TO PERSONAL COMPUTERS AND PERIPHERALS

If you want to buy your first system or expand your current system, don't make a decision without consulting this buyer's guide! You'll be provided with complete reviews on the leading microcomputers and peripherals on sale today. Compiled by the editors of CREATIVE COMPUTING, the #1 magazine of computer software, applications and evaluations. $3.95

From the publishers of A+, PC, PC TECH JOURNAL, PC WEEK and CREATIVE COMPUTING.

ZIFF-DAVIS PUBLISHING COMPANY

DEPT. **FM9F**, 39 EAST HANOVER AVENUE, MORRIS PLAINS, NJ 07950

Please send me the Buyers Guide listed below:

Title	Qty.	Price Each	Postage Handling	Total Price
A+ BUYERS GUIDE		$5.95*	$1.55	
PC BUYERS GUIDE		$7.95*	$1.55	
CREATIVE COMPUTING SOFTWARE BUYER'S GUIDE		$3.95**	$1.00	
CREATIVE COMPUTING BUYER'S GUIDE TO PERSONAL COMPUTERS & PERIPHERALS		$3.95**	$1.00	

Please add applicable sales tax: Total Amount

*Residents of CA, CO, CT, DC, FL, IL, MA, MI, MO, NJ and NY State. **Residents of CA, NJ and NY State.

Payment Enclosed $_____ (Outside USA add $1.50 per order.)

Charge My: ($10 minimum) ☐ American Express ☐ Visa ☐ MasterCard

Card No._____ Exp. Date_____

Mr/Mrs/Ms._____
print full name

Address_____

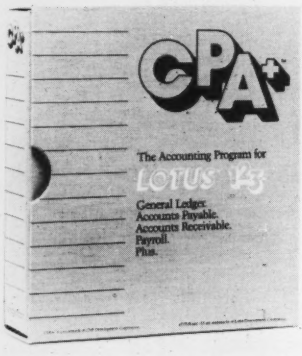
City/State/Zip_____

What's New In Software

Russ Lockwood

Accounting Program for Lotus 1-2-3

GNP has released *CPA+*, a fully integrated, menu-driven accounting program that operates with *Lotus 1-2-3*. It includes accounts receivable, accounts payable, general ledger, and payroll functions. Data are stored in memory for instant access. The $695 package runs on the IBM PC or compatible, requires 356K RAM, and includes a demonstration disk and tutorial.

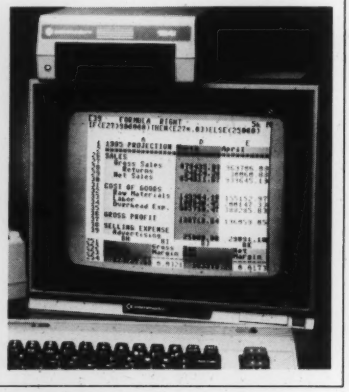


GNP
1244 E. Colorado Blvd.
Pasadena, CA 91106
(818) 577-7767

CIRCLE **425** ON READER SERVICE CARD

C64 Spreadsheet

Cardco has introduced *Calc Now!/64*, a spreadsheet for the Commodore 64. It has a capacity of 64 rows by 254 columns, reserves 39K of memory for data, and provides on-screen help. It supports logical operations AND, OR and NOT; standard and special mathematical functions; and horizontal and vertical windowing. It includes an on-screen calculator and carries suggested retail price of $39.95.



Cardco
300 S. Topeka
Wichita, KS 67202
(316) 267-6525

CIRCLE **426** ON READER SERVICE CARD

Word Processor for HP Portable

Lexisoft has released the *Spellbinder* word processing and office management system for the Hewlett-Packard Portable computer. Functions include word processing, mail merge, spelling checker, forms and data handling, columnar manipulation, and calculator. Files created on the HP Portable can be read by *Spellbinder* on the HP 150. The package retails for $495.

Lexisoft
Box 1378
Davis, CA 95617
(916) 758-3630

CIRCLE **427** ON READER SERVICE CARD

Software Updates for PC AT, et al.

Ashton-Tate has updated its integrated software package *Framework* to support the IBM PC AT and AT&T 6300. The company has also improved the copy protection system to allow *Framework* to be installed on a hard disk without the need to place the "key" disk in the floppy drive. *Framework* retails for $695, and the update is available to registered owners for $25.

Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230
(213) 204-5570

CIRCLE **428** ON READER SERVICE CARD

Microrim has released IBM PC AT versions of its *R:base* relational database management systems and *Clout* natural language software. *R:base* retails for $495, and *Clout* retails for $249.

Microrim
3380 - 146th Pl. SE
Bellevue, WA 98007
(206) 641-6619

CIRCLE **429** ON READER SERVICE CARD

MultiMate Update

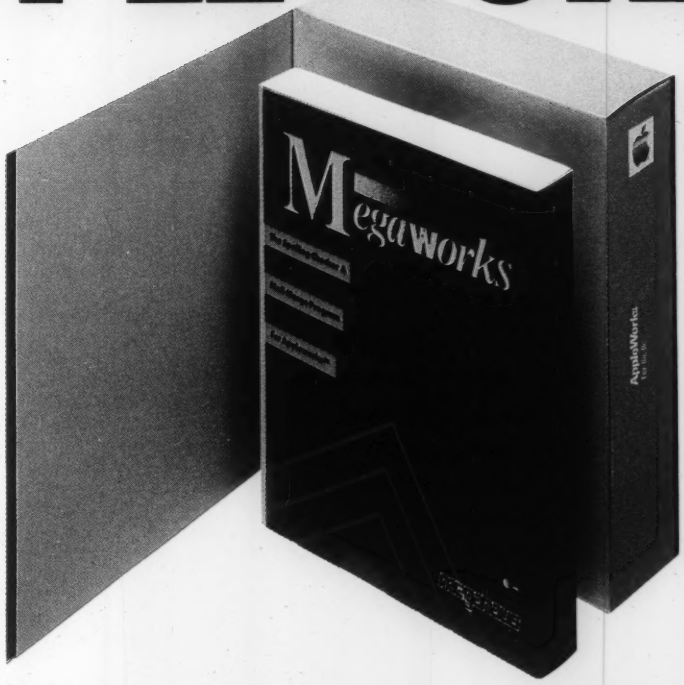
Multimate International has updated its *MultiMate* word processor to include proportional spacing, an improved merge utility to access standard ASCII files, document protection options, and support for 275 printers. *MultiMate* requires an IBM PC or compatible and 256K RAM.

Multimate International has also released a version of *MultiMate* for the HP 150 computer. Both versions retail for $495.

Multimate International
52 Oakland Ave., N.
East Hartford, CT 06108
(203) 522-2116

CIRCLE **430** ON READER SERVICE CARD

MEGAWORKS™ WITH APPLEWORKS.™



You already know AppleWorks™ is the powerful program that combines the three most popular applications for your Apple //e and //c. Its only drawback is the absence of two key functions.

That's why Megaworks with AppleWorks.

Megaworks is the mail merge and spelling correction program designed exclusively to complete the AppleWorks package. Your knowledge of AppleWorks makes MegaWorks simple to use. Mail merge lets you print personalized form letters from a single master letter and list. The spelling checker corrects misspelled words in documents and "word wrap" retains its original format, a function unavailable in many popular programs. The dictionary allows you to personalize your work with the addition of 10,000 words to its 40,000 word library.

Megaworks completes AppleWorks. See the complete works for your Apple //e and //c today at a dealer near you. Or send for our free, no obligation brochure.

megahaus™
WE MAKE COMPUTERS WORK HARDER.

5703 Oberlin Dr. Easier!
San Diego, CA 92121
619-450-1230

CIRCLE 132 ON READER SERVICE CARD

AppleWorks and Apple //e and //c are registered trademarks of Apple Computer, Inc.

Integrated Software

Electronic Arts, long known for its excellent games, has entered the business market with *Get Organized!*, an integrated software package for the IBM PC, PCjr, PC AT, and compatibles. It features a full function word processor, address book with mail merge, telecommunications manager, index card filing system, calendar, calculator, and notepad. It provides multiple windowing capability, comes with $200 in coupons for various telecommunications services, requires 256K RAM, and retails for $199.

Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
(415) 571-7171
CIRCLE **431** ON READER SERVICE CARD

Educational Software

MECC has introduced five educational programs for Apple II series computers.

Jenny's Journeys ($29.95) reinforces map reading skills. *Sound Tracks* ($29.95) allows children to compose and play music. *The Market Place* ($29.95) teaches basic economic concepts. *Discovery Lab* ($44) introduces the scientific process. And *Pets, Ltd.* ($43) allows children to select and care for a variety of pets.

MECC
3490 Lexington Ave., N.
St. Paul, MN 55112
(612) 481-3500
CIRCLE **432** ON READER SERVICE CARD

Floppy Disks

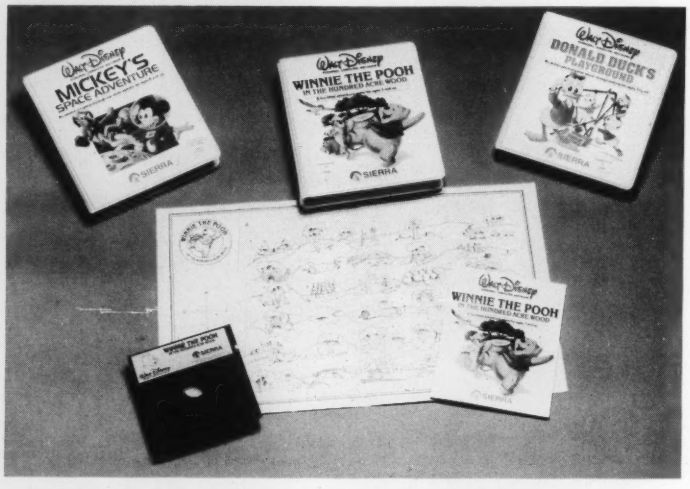
Fuji Photo Film USA has introduced 5.25″ floppy disks for use with the 1.2Mb IBM PC AT disk drive.

Fuji Photo Film USA
Magnetic Products Div.
350 Fifth Ave.
New York, NY 10118
(212) 736-3335
CIRCLE **433** ON READER SERVICE CARD

Polaroid has introduced a line of 3.5″, 5.25″, and 8″ floppy disks.

Polaroid
575 Technology Sq.
Cambridge, MA 02139
(617) 577-2000
CIRCLE **434** ON READER SERVICE CARD

Walt Disney Software



Walt Disney has entered the software business with three educational software packages programmed by Sierra On-Line for the Apple II, IBM PC/PCjr, Commodore 64, and Radio Shack Color Computer. All programs retail for $39.95.

Mickey's Space Adventure uses an adventure game format to teach children about our Solar System. *Donald Duck's Playground* promotes money-handling skills with an emphasis on change making. *Winnie the Pooh in the Hundred Acre Wood* develops mapping and reading skills.

Walt Disney Personal Computer Software
500 S. Buena Vista St.
Burbank, CA 91521
(818) 840-5965
CIRCLE **435** ON READER SERVICE CARD

Graphics Software from AT&T

AT&T has introduced two graphics software packages for the AT&T 6300 equipped with either the AT&T Video Display Adapter or the AT&T Image Capture Board. Prices have not been set.

AT&T Paint and Image Processing Software features color manipulation, text overlay, merging of multiple images, drawing, and layout. It can also create NAPLPS frames for videotext services.

AT&T Business Graphics Presentation Software is compatible with *AT&T Paint* and is used to create two- and three-dimensional charts and graphs. It can use data from *Lotus 1-2-3*, *SuperCalc3*, and other spreadsheets and may be programmed to display a "slide show" of images.

AT&T
2002 Wellesley Blvd.
Indianapolis, IN 46219
(317) 352-6126
CIRCLE **436** ON READER SERVICE CARD

Microsoft Macro Assembler

Microsoft has released a new version of its Macro Assembler. It supports the entire Intel family of 16-bit microprocessors, including the 8088, 8086, 8087, 80186, 80286, and 80287. An extensive set of program development utilities, including a new symbolic debugger, is included with the assembler. The Macro Assembler retails for $150.

Microsoft
10700 Northup Way
Box 97200
Bellevue, WA 98009
(206) 828-8080
CIRCLE **437** ON READER SERVICE CARD

TAKE THE FEAR OUT OF USING THE TOOLS OF MODERN MAN.

Primitive man drew on the walls of his cave because he knew a central truth…that a picture is worth a thousand words. The same is true today about computer training. To get the most out of using a computer and its software, you need a comfortable training system you're already familiar with. Something you can use and enjoy in the privacy of your own home, office…or cave. It begins with your television.

INTRODUCING CompuTutor™

CompuTutor, developed by Chase Scientific, is a remarkable series of plain language computer training programs on videocassette. CompuTutor gives you an immediate hands-on experience by providing real-life personal computing applications. The method is simple. Using your TV and videocassette recorder side by side with your personal computer, you set the pace. Start and stop the video program at any point. Skip sections you already know and review others as many times as you want.

Within minutes you'll begin to use your computer with ease and confidence.

As entertaining as they are informative, CompuTutor hardware and software training systems are designed specifically for your IBM®-PC…Apple® IIe… TRS-80® Model 4 and many compatibles. Popular software like Lotus™ 1-2-3™…Framework™… dBASE II®…dBASEIII™…WordStar®… SuperSCRIPSIT™ and VisiCalc® perform even better because CompuTutor makes them easier to understand, through state-of-the-art video technology—with a warm, human touch.

Start learning today…Start using tonight, with CompuTutor from Chase Scientific. And put the tools of modern man to work for you.

Order CompuTutor Now. For Visa and MasterCard orders Call Toll Free: (In California) 1 (800) 528-2554. (Outside California) Call Collect: 1 (213) 395-7884; Mon.-Sat. 9-5pm (Pacific). Or, if more convenient, fill in the order form below.

(Dealer and distributor inquiries welcome.)

CompuTutor™ ORDER FORM

PLEASE SELECT PROGRAMS FOR YOUR COMPUTER:
(Call About Compatibles)

Titles	Machine		
	IBM-PC	APPLE IIe	TRS-80, IV
Using Your Machine			
Using VISICALC®			
Using WORDSTAR®			(NA)
Using SuperSCRIPSIT™	(NA)	(NA)	
Using dBASE II®	(NA)		(NA)
Using dBASE III™		(NA)	(NA)
Using LOTUS™ 1-2-3™		(NA)	(NA)
Using FRAMEWORK™		(NA)	(NA)

Video Format (Please check): ☐ **VHS** ☐ **BETA**

_____ **CompuTutor Programs at $69.95 each.** (Please add $5.00 shipping and handling for each item.) California residents add 6.5% sales tax

Total enclosed $_____

☐ **Check** ☐ **Money Order** ☐ **Visa** ☐ **MasterCard**

Card # _____ Exp. Date _____

Ship To:

Name _____

Address _____

City _____ State _____ Zip _____

Signature _____

Send Check or Money Order Payable To:
CHASE SCIENTIFIC 1311 Colorado Ave., Santa Monica, CA 90404
(Please allow 3-4 weeks for delivery)

☐ Yes, I am interested, but send me further information on: _____
(Program Titles)

CompuTutor is a trademark of Chase Scientific Inc. IBM-PC is a registered trademark of International Business Machine Corporation. Apple IIe is a registered trademark of Apple Computer Inc. TRS-80 Model 4 is a registered trademark of the Tandy Corporation. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. dBASE II is a registered trademark of Ashton-Tate. dBASE II and Framework are trademarks of Ashton-Tate. WORDSTAR is a registered trademark of Micro Pro International Inc. VisiCalc is a registered trademark of Software Arts Inc. Framework is a trademark of Ashton-Tate. SuperSCRIPSIT is a trademark of the Tandy Corporation. © 1985 Chase Scientific Inc.

CC485

Educational Computing: Where Are We Now?

Betsy Staples

This issue of *Creative Computing* focuses on the use of computers in education—hardly a new idea. Universities and colleges have been using mainframes and minis in mathematics, statistics, and other quantitative subject areas for decades. Microcomputers have been worming their way into all levels of education for close to a decade.

Educational computing still has a long way to go, however, before it becomes the integral part of the educational process that computer literate parents and educators want it to be.

The problems faced by people who want to use computers as educational tools have changed over the years. It used to be that hardware was the primary obstacle. Early cassette-based Apple II's, TRS-80 Model I's, and Commodore Pets were balky beasts that could be relied upon primarily to fail when they were needed most. (How many contemporary computerists have ever heard the bone-chilling screech of a computer program being played through the speaker of a cassette player as its user searches for the correct volume?)

Disk drives were scarce luxuries—and far too temperamental (not to mention expensive) to expose to the rigors of classroom use. (The original line of Creative Computing Software included quite a few educational programs, but only two floppies.)

Today the computer hardware industry is of age. The new machines are far from flawless, of course, but for the most part, we can call them "reliable" with a straight face. The current generation of Apples, the capable Commodore 64, the old faithful Atari line, the newer Tandy models, and many other micros have proven their durability in countless classrooms around the world.

And disk-based systems are now the norm. Which brings us to the problem at hand: Now that most of the hardware hurdles have been overcome, the primary barrier to effective utilization of computers in education is lack of high quality software.

Yes, we've said it before, but unfortunately, it is still true that a great deal of the so-called educational software on the market today is worthless. We are reminded that it is true every month when we try to find worthy products to review in "Growing Up Literate." We find that the products of only a few manufacturers rise to the top of the pile month after month. So many of the others suffer from poor pedagogy, inadequate documentation, amateurish programming, lack of support, and a plethora of lesser ills. "How discouraging it must be," we think, "to be a parent or educator drifting helplessly in this uncharted sea of highly touted, expensive, and potentially useless software."

What's a mother (father, teacher, grandparent) to do? The most important thing is to make every attempt to preview educational software before purchasing it. This formal sounding "preview" can take any form from looking at a friend's copy to sitting through a formal presentation by a salesperson. Probably the most practical way is to ask an employee of your local computer store to let you play with a program for a few minutes before you decide whether to buy. Another way, of course, is to look for favorable reviews here in the pages of *Creative Computing*. But since space constraints allow us to evaluate only a few packages each month, we may never be able to publish the review you are looking for.

You can, however, apply the same criteria we apply to a package when you do your own evaluation. Long-time readers and those who keep up with "Growing Up Literate" probably have a pretty good idea what these are, but for new readers, we list them here in no particular order.

• Purpose. Different types of educational programs serve different purposes. The most obvious, and the easiest to program, is *drill and practice*. Drill and practice programs, many of which wear the guise of games, definitely have a place in the educational process, but they must not be confused with programs that actually teach. To make good use of a drill and practice program, the student must have some knowledge of the subject matter being drilled. A *tutorial* program that is designed to teach a series of concepts or facts can be used to advantage by almost any student in the recommended age range without prior introduction to the material. The last major category of educational software is *simulations*. Simulations use experience to teach both facts and concepts. Using a program that requires him to bring a malaria epidemic under control, for example, the student learns facts about mosquitoes, chemical pesticides, and treatment of disease. He also assimilates (painlessly, we hope) important ecological concepts.

• Documentation. The user's manual does not have to be fancy, but it should be well organized and free of spelling and grammatical errors. It never ceases to amaze us how many programs that claim to be educational come with error-fraught documentation. The user's manual should also tell you what the program is designed to accomplish—it should list educational objectives.

• Pedagogy. When we say that a program must be pedagogically sound, we mean that it must teach or drill facts and concepts that are worth knowing in a manner that is consistent with proven educational techniques. Asking the student, for example, to choose the correctly spelled word from a list of incorrectly spelled words is not pedagogically sound.

• Programming. The program should take advantage of the latest hardware advances and software innovations that your computer offers. Good graphics add to the appeal of a program, but if the student must sit idle while hi-res screens are loading from disk, he will soon come to think of them as an annoyance rather than an enhancement. There should always be a way to "give up" on a question or return to a menu without resetting the machine. Other good programming techniques are less obvious, but software written by an imaginative professional programmer will always stand out when compared with programs of lesser quality.

Obviously, there are many fine points to be considered in each of these categories. As you become familiar with good software (and bad) you will develop your own checklist and soon find that you can identify a quality package after only a few minutes of inspection. ■

BASF QUALIMETRIC™ FLEXYDISKS®. A GUARANTEED LIFETIME OF OUTSTANDING PERFORMANCE.

BASF Qualimetric FlexyDisks feature a unique lifetime warranty, firm assurance that the vital information you enter on BASF FlexyDisks today will be secure and unchanged tomorrow. Key to this extraordinary warranted performance is the BASF Qualimetric standard... a totally new set of criteria against which all other magnetic media will be judged.*

You can count on BASF FlexyDisks because the Qualimetric standard reflects a continuing BASF commitment to perfection in magnetic media. One example is the unique two-piece liner in our FlexyDisk jacket. This BASF feature traps damaging debris away from the disk's surface and creates extra space in the head access area for optimum media-head alignment. The result is a guaranteed lifetime of outstanding performance.

For information security that bridges the gap between today and tomorrow, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

**Contact BASF for warranty details.*

CIRCLE 101 ON READER SERVICE CARD

ENTER TOMORROW ON BASF TODAY.

BASF

1983 BASF Systems Corp., Bedford, MA

Goodbye, Little Red Schoolhouse

This directory is intended to provide readers with an overview of the educational software market. The packages described here are representative of the software available from the various manufacturers, and the descriptions are based on information supplied by those manufacturers. Inclusion of a product in this listing does not imply that it has been evaluated or endorsed by the editors. For more information, contact the manufacturers directly (and please mention that you read about their products in Creative Computing).

American Educational Computer, Inc.

Basing its marketing approach on teacher-designed, curriculum-based programs, AEC uses a three-level approach in its software. Students must first complete an objective assignment and then can proceed to an action game using the information gained in the first stage. Finally, parents and teachers can add more advanced lessons geared to the child's abilities. *AEC Spelling* for grades two to eight features a basic 4233-word vocabulary which can be expanded as required. Basic grammar, vocabulary, geography, and Spanish skills are taught with *AEC MatchMaker*, which combines sound, interactive lessons, and graphics for all age ranges. *EasyReader* program topics include basic phonics, word structure, and comprehension skills and are organized to coincide with the regular grade school curriculum. Interactive procedures tailor the lessons to the individual student with the software keeping track of the users by name and progress level.

System: IBM PC, Apple II, C64, Atari

Address:

2450 Embarcadero Way
Palo Alto, CA 94303
(415) 494-2021

Photography by Jeff MacWright.

Educational software graduates to new levels at school, home, and business

Carol A. Crowell

Artworx Software Company, Inc.

Filling in the missing link and introducing a monkey to educational software define the two distinctive product categories of Artworx. Three individual programs, *Math Factory, MonkeyNews,* and *MonkeyBuilder,* make up the Monkey Series for grades one to six, using Marc the Monkey to teach basic learning skills in arithmetic, reading, and spelling. *MonkeyBuilder,* a vocabulary building program, uses a heuristic design which automatically adjusts the difficulty level by evaluating the student's responses for accuracy and speed. Incorporating a memory device that associates a word with a vivid visual image, the *Linkword* foreign language series is designed to impart a conversational vocabulary of 400 words along with the basic rules of grammar in about 10 hours in Spanish, French, German, or Italian.

System: Apple II, C64, Atari

Address:

150 North Main St.
Fairport, NY 14450
(716) 425-2833

Ascension Designs A.D. 1984

Promoting the philosophy that the home computer is a useful tool for teaching Christian values and Bible-based principles, Ascension is marketing what it says are "non-denominational, non-doctrinaire educational programs designed to teach, reinforce and uphold spiritually enriching, life-building principles." Using graphics and animation, *Right Again!* is a game-tutorial program that employs an electronic angel to guide children ages 8 to 12 through Biblical history, stories, regions, and values. A book of Bible stories and geography also is included. Other Bible-based programs are planned both for additional age groups and as family-oriented activities.

System: IBM PC, Apple II, C64

Address:

6108 N. Western
Oklahoma City, OK 73118
(405) 848-5773

Avant Garde Publishing Corp.

A combination of error analysis and step-by-step demonstration that mirrors the actual teaching/learning process between teacher and student is the basis for four new programs in math and logic. *Introductory* and *Intermediate Algebra* programs provide progressive difficulty levels for grades eight through 12 with automatic timing and scoring so that students can compete against each other or the clock. *Logic Workout* introduces intermediate and high school students to classical logic and syllogisms with proof patterns and random combinations. *The Magic Cash Register* for younger children sets up a store with products, pricing and simulated purchases.

System: Apple II, C64

Address:

1907 Garden Ave.
Eugene, OR 97403
(503) 345-3043

Bantam Electronic Publishing

Following the trend of large book publishing houses entering the educational software field, Bantam Books is preparing to issue three lines of specialty programs after almost two years of development. The series are Selfware, a line of self-improvement software for adults; MicroWorkshop, learning games for children; and Living Literature, interactive fiction for all ages. Colorfully illustrated and generally based upon best-selling books, the software is designed to teach self-expression and deductive reasoning as well as self-improvement. *Fantastic Animals* is a learning game, for ages 4 to 9, that teaches animal and body part recognition and animal habitat identification. *Creative Contraptions,* for ages 7 and up, encourages children to create clever, humorous, and zany machines to accomplish everyday tasks.

System: IBM PC, Apple II, C64

Address:

666 Fifth Ave.
New York, NY 10103
(212) 765-6500

Batteries Included

Based upon traditional typing school methods, the *Keys to Typing* instructional software is a 32-lesson, six-week course for students from intermediate levels through high school that produces an average 40 words per minute typing proficiency. Featuring an error-proof, cursor-controlled menu, the program provides more than 400 individual exercises ranging from key introduction to specially designed typing games for reinforcing previous lessons and increasing speed.

System: C64

Address:

30 Mural St.
Richmond Hill, ON L4B 1B5
(416) 881-9941

Baudville

Making the computer scene with color graphics, animation, and courseware designed to illuminate the visual media, Baudville shapes interactive educational programs and companion libraries to a wide variety of age groups and applications. *Take 1* sets the stage with full color movie and cartoon capabilities, while the animation libraries allow the user to develop plots and characterization. *Heroes & Villains* and *Actors & Actions* provide an assortment of fully developed actors, actions, and scenes, allowing the user to become writer, director, and temperamental artist. The *Shape* libraries are electronic stencils and templates with text fonts and shape tables for astronomy, botany, chemistry, anatomy, and math.

System: Apple, C64

Address:

1001 Medical Park Dr., S.E.
Grand Rapids, MI 49506
(616) 957-3036

Brainworks, Inc.

Using a concept of discovery learning that incorporates fundamental intellectual skills such as logic, memory, and problem-solving, this company

claims that its software helps people learn how to learn. Its latest product, *Chipwits*, uses principles of artificial intelligence to teach robots to think for themselves while familiarizing the user with hundreds of behavioral combinations that could apply to real people in "real-life adventure situations." No programming knowledge is required; programming of the robots is accomplished with illustrated chips, or icons, that give the robots an almost unlimited variety of people-like qualities and behavior patterns. Robots are sent on a variety of dangerous missions of increasing difficulty, and in the event of failure, are brought back to the workshop for brain draining and re-chipping. Another mind challenging program is *BrainTrain*, which is designed to improve memory, to determine right or left brain dominancy, and to measure the improvement, if any, in both hemispheres.

System: Apple II and Macintosh
Address:
24009 Ventura Blvd.
Calabasas, CA 91302
(818) 884-6911

Broderbund Software

Mystery, muppets, and modules introduce a new Explorations series of "educationally entertaining software" for elementary and intermediate levels. The S.S. Microship sets sail in *Welcome Aboard, A Muppet Cruise to Computer Literacy* with passengers programming the vessel's course, glamorizing Miss Piggy with computer-aided designs, using word processing and electronic mail, and managing ship's comedian Fozzie Bear's database of truly terrible jokes. Castaways can find out where they are with *Where in the World is Carmen Sandeigo?*, an international mystery that comes with a *1985 World Almanac and Book of Facts* and a map of the world, and uses full-color animation and sound effects to teach geography and problem solving. *Science Toolkit* is a combination software and hardware package that turns the computer into a real science lab. Temperature- and light-sensing probes connect to the joystick port while on-screen instruments include a light meter, thermometer, timer, ohmmeter, and strip-chart recorder.

System: Apple II
Address:
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170

CBS Software

Time and the cycles of life have been preempted by CBS in its schedule of educational programs targeted for specific periods. The range of software and defined times include preschool, fun and learning, school, career, and leisure. Ages 3 to 6 can visit Sesame Street with *Big Bird's Special Delivery*, an object recognition and classification game. Turning 7 means turning on *Webster: the*

Word Game to learn spelling at progressive speeds and levels of difficulty. *Success with Math* covers number manipulation from basic arithmetic to quadratic equations, and every level from elementary to geriatric. *Mastering the SAT* and *Mastering the College Boards: English Composition* are self-paced, comprehensive programs for review and preparation. Adult education includes *Personal Development* and *Managing for Success*, self-paced, interactive programs that utilize case studies and simulations of day-to-day situations for practice and evaluation. Adults and older students can increase their leisure time by completing *Micro SpeedRead*. Twelve tangled webs of crime and puzzlement put powers of logic and deduction to the test with *Mystery Master: Murder by the Dozen*.

System: IBM PC, Apple II, C64, Atari
Address:
One Fawcett Pl.
Greenwich, CT 06386
(203) 622-2525

Commodore Business Machines, Inc.

Open-ended programs that run differently for each player, and differently each time they are used, is the goal of Commodore, a company that says its educational software can be used for a wide range of educational levels without becoming stale. For example, its *Just Imagine* program, which technically is for an age range of 4 to 14, can be used at the kindergarten level as well as for older children since the basic program can be altered to suit the differing needs of these groups. A creative writing program, this software contains a library of scenes and objects which can be combined to form pictures on the scene. The user then writes an imaginary story describing the activity. When the program is operated, the objects and people in the foreground are animated to form a continuous motion picture effect. *The Reading Professor*, for ages 12 to adult, is designed to increase reading speed and comprehension either as part of a school program or in independent study. The program consists of 10 lessons at four difficulty levels.

System: C64, Plus 4
Address:
1200 Wilson Dr.
West Chester, PA 19380
(215) 431-9100

Compu-Teach

Introducing a curriculum of integrated educational software, Compu-Teach says it is basing its instructional concept on providing children with a sense of control over the computer in order to create a feeling that the computer is responding to them. For young children beginning at age 2, *Sign Play* is an interactive program designed around the prevalence of signs, such as "Walk" and "Stop," in the everyday world. The object is to teach the child first to make the connection between words and signs with distinctive shapes and then to comprehend the letters on the signs as parts of a word independent of the shape and color of the sign. *Word Pieces* continues the process with drills to familiarize the child with the letters of the alphabet, provide ways of distinguishing between the letters, and then build the child's vocabulary.

System: IBM PC, Apple II
Address:
240 Bradley St.
New Haven, CT 06511
(203) 777-7738

Data Processing Educational Corp.

Students and business people can learn computer literacy with Instant Tutor, a training series which currently includes tutorials covering how to use the IBM PC and DOS, *WordStar, dBase II,* and *SuperCalc* on the IBM PC and compatibles. Designed for computer novices, each program features eight to 10 self-paced, individual lessons with instructions, review sections, optional quizzes, and explanatory simulations. Users can follow the scan option for a quick overview of major topics or the study option for in-depth instruction. A reference guide includes additional practice exercises.

System: IBM PC

Address:

4588 Kenny Rd.
Columbus, OH 43220
(614) 457-0577

Davidson & Associates

Stressing motivation as the primary factor in encouraging students to increase basic skills in spelling, reading, vocabulary, and math, Davidson says its programs turn educational drudgery into educational fun. Animation, color, and optional sound effects enhance *Spell It,* a progressive spelling tutor and game combination that starts with 1000 of the most commonly misspelled words and incorporates spelling rules for ages 10 to adult. *Word Attack* is a vocabulary building system with words and sentences illustrating usage presented on nine different levels for ages 8 to adult. With more than 600 problems in basic arithmetic, including decimals and fractions, *Math Blaster* is targeted for ages 6 through 12 and allows parents and teachers to add additional problems. *Speed Reader II* is a reading development course professionally designed to increase speed and comprehension with 30 minutes of daily practice while providing a grade level analyzer to determine reading level and progress.

System: IBM PC, Apple II, and C64

Address:

6069 Grove Oak Place #12
Rancho Palos Verdes, CA 90274
(213) 373-0971

DCH Educational Software

In business for just under a century, D. C. Heath feels it knows enough about educational standards and requirements to offer a full 30-day trial on any of its classroom software products that cover grades K-12 in a wide variety of subjects. Computer aided instruction programs include graphics, tutorials, assignment and review capabilities, and interaction with managerial systems for tracking student progress and generating class lists and test results, as well as individual and class diagnostic reports. Among the products offered is *Quill,* a four-module software program that teaches writing skills and reinforces the importance of

planning, drafting, revising, and sharing writing with the help of a computer. The study of earth, life, and physical sciences is provided in the company's series of nine interactive programs that allow students to test ideas, work with simulations, and formulate hypotheses. *Enns Mathematics Software* consists of 19, test-independent programs grouped into course packages with color graphics, tutorials, and drill and practice activities.

System: IBM PC, Apple, C64, TRS-80

Address:

125 Spring St.
Lexington, MA 02173
(800) 428-8071

DesignWare

Coming to the aid of parents who need to encourage their children to do homework, DesignWare has developed a series of interactive educational programs that blend teaching with entertainment. Easily customized to supplement current school assignments, the programs cover core subjects and basic skills at several difficulty levels for students ages 5 to 18. As a reporter on *The Grammar Examiner,* children learn grammar skills by editing hundreds of humorous news stories. Family history can be added to *States & Traits,* a course in U.S. geography that discusses land forms, trivia, and locations of historic events. Solving groups of equations in *Mission: Algebra* helps rescue a stricken space ship while the computer monitors the student's progress.

System: IBM PC, Apple, C64, Atari

Address:

185 Berry St.
San Francisco, CA 94107
(415) 546-1866

EduWare

A comprehensive line of tutorial and simulation software that emphasizes a one-on-one learning situation between an enthusiastic student and the undivided attention of a very smart, endlessly patient instructor is the special pervue of this company with programs for pre-teens to adult. Typical of this approach is *Wilderness,* a survival simulation that draws upon interrelated databases dealing with weather, topography, animal and plant life, and health conditions specific to particular geographic areas of the world. Using a graphics generating system that creates three-dimensional panoramas which change depending upon the player's point of view, the game provides two survival scenarios for players trekking through the unknown. There are 10 levels of difficulty and an assortment of toxic plants, inclement weather, and agitated wildlife.

System: Apple II, C64

Address:

28035 Dorothy Dr.
Agoura Hills, CA 91301
(818) 706-0661

Electronic Courseware Systems, Inc.

While extensive music software is the keynote of ECS, managing a classroom learning environment is the hallmark of the company's educational philosophy. Three Midi-Musicware programs using an interface board, synthesizer, and the computer are designed to teach basic skills in music. *Keyboard Note Drill* increases speed in identifying notes randomly placed on the bass and treble staves with response time adjusted to the level of difficulty. Increasing tonal memory of a series of pitches played by the computer is the goal of *Super Challenger,* an aural-visual game. *Keyboard Jazz Harmonies* is a six-part program

developed to teach chord symbols, 7th-chord recognition, and chord spelling. *Practical Music Theory*, *Music Terminology*, and *Early Music Skills* are designed to educate music students of all ages and maintain records of progress. The company also offers some programs in math and English grammar.

Systems: IBM PC, Apple II, C64

Address:

309 Windsor Rd.
Champaign, IL 61820
(217) 359-7099

Epcot Educational Media

In keeping with Epcot's science and technology theme, Disney's Epcot Educational Media has introduced three programs in science and business for junior high school students and older. *Internal Journey* uses an interactive format, color graphics, animation, and music to teach nutrition and the process of food digestion and conversion in humans. As energy scientists in *Galactic Prospector*, students conduct geological and meteorological tests and evaluate data to find available energy sources on a new planet. A simulated amusement park in *Cosmic Carnival* is the setting for students to learn about the energy costs and operating expenses of managing a business.

System: Apple II

Address:

500 South Buena Vista St.
Burbank, CA 91521
(818) 840-5290

Epyx Computer Software

Gearing its software products to strategic thinking and adventure-role playing, this company strives for what it feels is the optimum balance between educational material and entertainment in its Learning Fun series for 6- to 12-year-olds, with typing and logic programs for ages 6 to 60. Based upon the movie of the same name, Epyx's *9-5 Typing* program combines seven basic typing skills and 49 drills with animated sequences from the motion picture. Players can increase speed by taking potshots at Hart in a shooting gallery or learn key locations by helping Doralee escape from Hart. Epyx also is releasing its own version of *Chipwits*.

System: IBM PC, Apple II, Atari, C64

Address:

1043 Kiel Ct.
Sunnyvale, CA 94089
(408) 745-0700

Fisher-Price

The 12 and under class is a special prerogative of this company that specializes in tot to pre-teen educational games designed to make computer literacy and basic learning skills fun. *Movie Creator* is a new product that teaches children 6 to 10 to create colorful, fully animated movies complete with a music soundtrack and a script. *SongMaker* lets children play or modify 15 traditional songs or create their own musical compositions. Auditory and visual cues, along with animated animals, introduce the child to concepts of musical pitch. *Up & Add 'Em* helps children from 3 to 7 learn basic counting, addition and subtraction. *Logic Levels* encourages logical thinking and helps children 7 to 12 learn to predict the outcome of a series of actions. A complete catalog of educational games is available from the company.

System: Apple II, C64

Address:

P.O. Box 1327
Cambridge, MA 02238
(617) 494-1222

FlipTrack Learning Systems

With a variety of training courses on microcomputer operations and software, FlipTrack teacher cassettes put a personal tutor into the classroom or office. Nothing is simulated in these hands-on, user-paced courses that provide about two hours of instruction per cassette. A clear, concise index and special formatting system allow the user to select specific topics for study or review without going through the entire tape. Cassettes are available for both professional and home computers, word processing software, including *Apple Writer, EasyWriter II*, and *WordStar*; spreadsheets, including *Multiplan, Supercalc*, and *Visicalc*; and the integrated packages *Framework* and *Lotus 1-2-3*.

System: IBM PC, Apple II, Atari, C64, Vic-20, Coleco

Address:

999 Main, Suite 200
Glen Ellyn, IL 60137
(312) 790-1117

Grolier Electronic Publishing, Inc.

It should be no surprise that the world's largest publisher and distributor of encyclopedias would introduce a line of educational software designed not only to encourage reading but also to develop "essential information literacy" skills. The Adventures in Knowledge series integrates books and software in *Secrets of Science Island* which uses adventure to explain science facts. Using an authoritative reference book about explorers, *Treasure Hunters* promotes reading in history and geography through a global quest for buried treasure. A resource book offering additional learning activities for use by instructors, parents, and students is included with each software package. *Step One* for beginners and computer novices is an interactive program which uses nine learning modules for developing skills ranging from writing and editing to using the computer as a fully functioning, simulated piano.

System: Apple II, C64

Address:

95 Madison Ave.
New York, NY 10016
(212) 696-9750

Hartley Courseware, Inc.

Composed of colorful, interactive computer readiness games, Hartley's *Early Discovery* series for pre-schoolers uses sound and animation to encourage interest and concentration through increasing difficulty levels. *Color and Shapes* combines discrimination of the title elements with reinforcement of top-to-bottom and left-to-right eye movements that will be required in future reading. *Patterns and Sequence* begins with matching single objects and progresses through abstract patterns in series to filling in the parts of missing letters. For high school students, the company produces *Intellectual Pursuits* with questions from English and American literature as well as mythology. Deductive reasoning to promote logical thinking is the goal of *Perplexing Puzzles*, a program that helps the beginning fourth to tenth grade student, but leaves advanced students on their own. *Kittens, Kids, and a Frog* for first and second graders is designed to develop inferential and factual comprehension. For children in grades three and four, the company offers *Reading for Meaning II with Mother Goose*.

System: Apple II

Address:

133 Bridge St.
Dimondale, MI 48821
(517) 646-6458

Educational Software
That Works:

Spell.

Spell It!

Spell expertly 1000 of the most misspelled words. Learn the spelling rules. Improve with 4 exciting activities, including a captivating arcade game! Add your own spelling words.

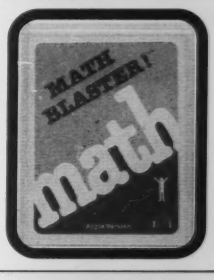
ages 10 — adult / 2 disks: $49.95

Math.

Math Blaster!

Master addition, subtraction, multiplication, division, fractions, decimals and percentages — by solving over 600 problems. Learn your math facts with 4 motivating activities, including a fast-action arcade game! Add your own problems.

ages 6 — 12 / 2 disks: $49.95



Word.

Word Attack!

Add 675 new words to your vocabulary — with precise definitions and sentences demonstrating usage. Build your skills with 4 fun-filled activities, including an arcade game! Add your own words.

ages 8 — adult / 2 disks: $49.95

Read.

Speed Reader II

Increase your reading speed and improve comprehension! Six exercises designed by reading specialists vastly improve your reading skills. Chart your own progress with 35 reading selections and comprehension quizzes. Add your own reading materials.

high school, college & adult / 2 disks: $69.95

The Davidson Best Seller Tradition.

For your Apple, IBM or Commodore 64.
Ask your dealer **today**.

For more information call: (800) 556-6141
In California call: (213) 373-9473

Davidson & Associates
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274

CIRCLE 123 ON READER SERVICE CARD

Davidson.

Teacher Certified NEA

Apple, IBM and Commodore 64 are trademarks respectively of Apple Computers, Inc., International Business Machines Corp., and Commodore Business Machines, Inc.

THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM

#C16

DEALERS WE BUY EXCESS INVENTORIES

CONROY

TELEX 910 380 3980 **ALL MAIL: 12060 SW Garden Place, Portland, OR 97223**

FOR YOUR APPLE

COMPUTERS

apple

SYSTEMS IN STOCK CALL

LIMITED WARRANTY—*100% Parts & Labor for 90 days by us.*

FLOPPY DISK DRIVES

	LIST	CONROY
MICRO-SCI, A2, 143K Disk Drive	$ 345	$ 195
A2 Controller Card	$ 100	$ 60
Half Height Drive for IIe	$ 269	$ 195
Half Heiht Drive for IIc	$ 299	$ 209
TEAC, T40, Half Ht., Direct, 163K.	$ 249	$ 169
Controller Card by ComX	$ 110	$ 45
T80, Half Ht., Double, 326K	$ 449	$ 329
Controller Card by Teac	$ 85	$ 59
RANA, Elite I, 163K, 40 Track	$ 379	$ 199
Elite II, 326K, 80 Track	$ 649	$ 369
Elite Controller	$ 145	$ 89
VIDEO TECH, Half Ht. Drive	$ 225	$ 149

HARD DISKS

QUARK, QC10 for IIc/IIe/III/MAC	$1995	$1595

OTHER HARDWARE

CCS, 7711 Serial Interface	$ 150	$ 90
CPS/EASTSIDE, Wild Card II (copier,+/e)	$ 140	$ 99
COMX, 80 col. +64K RAM Card (IIe)	$ 199	$ 99
16K RAM Card (II+), 1 yr. Ltd. Wty.	$ 179	$ 39
HAYES, Mach II Joystick (+/e)	$ 45	$ 29
KENSINGTON, System Saver Fan	$ 90	$ 65
KEY TRONIC, KB200 Keyboard	$ 298	$ 189
KOALA, Muppet Keys	$ 80	$ 49
Touch Tablet w/Micro Illustrator	$ 125	$ 75
KRAFT, Joystick (II/II+)	$ 65	$ 49
Game Paddles (II/II+)	$ 50	$ 39
MAR, Sup R fan (II+)	$ 50	$ 30
MICROSOFT, 16K RAM Card (II+)	$ 100	$ 69
Z80 Softcard (+/e)	$ 345	$ 235
Z80 Softcard Premium (e)	$ 395	$ 275
ORANGE MICRO, Grappler Plus (+/e)	$ 149	$ 99
Serial Grappler	$ 119	$ 79
16K Buffer Board for Grappler Plus	$ 99	$ 69
Buffered Grappler Plus, 16K	$ 239	$ 159
2 Chip Set for Buffered Grappler	$ 28	$ 12
PAYMAR, Lower Case Chip, Rev. 7 (+)	$ 50	$ 19
PCPI, Applicard 6 MHz, 14 features	$ 375	$ 275
RH ELECTRONICS, Super Fan II	$ 75	$ 59
TITAN, Accelerator IIe	$ 319	$ 219
128K RAM Card (II+)	$ 599	$ 329
Other RAM Cards & Software IN STOCK		CALL

OTHER HARDWARE

	LIST	CONROY
TRACKHOUSE, Numeric Key Pad	$ 149	$ 94
TG, Select-A-Port	$ 40	$ 26
Joystick or Game Paddles	$ 45	$ 29
VIDEX, UltraTerm (+ or e)	$ 379	$ 229
VideoTerm 80 col. card (+/e)	$ 279	$ 175
PSIO I/F Card	$ 229	$ 145

MACINTOSH

SM

BLUECHIP, Millionaire	$ 60	$ 39
CENTRAL POINT, Copy II MAC	$ 40	$ 30
CONROY-LAPOINTE DISKETTES. DS/DD, 3½", 10 in flip pak	$ 65	$ 29
CONTINENTAL, Home Accountant	$ 100	$ 65
CREATIVE SOLUTIONS, MacForth Level I	$ 149	$ 75
DOW JONES, Market Manager	$ 249	$ 159
HAYDEN, Sargon III	$ 50	$ 33
HUMAN EDGE, Sales or Mgmt. Edge, ea.	$ 250	$ 159
KENSINGTON, Starter Pak	$ 90	$ 60
Surge Suppressor	$ 50	$ 35
LIVING VIDEOTEXT, Think Tank	$ 145	$ 85
LOTUS, Jazz		CALL
MAIN STREET, Filer or Writer, ea.	$ 199	$ 125
MAXELL, 3½" Diskettes, 10 pack	$ 60	$ 35
MEGAHAUS, Megaform	$ 195	$ 125
MICROSOFT, BASIC Interpreter	$ 150	$ 95
Word, File or Multiplan, each	$ 195	$ 129
MILES, Mac the Knife	$ 39	$ 25
MONOGRAM, Dollars & Sense	$ 150	$ 95
NOVATION, Smartcat Plus Modem w/soft	$ 499	$ 379
ODESTA, Helix	$ 395	$ 265
PENGUIN, Graphics Magician	$ 50	$ 32
PROMETHEUS, ProModem 1200 w/cabl & softw	$ 495	$ 350
PROVUE, OverVue	$ 295	$ 195
SCARBOROUGH, Mastertype	$ 35	$ 19
SIMON & SCHUSTER, Typing Tutor III	$ 50	$ 33
SOFTW PUB., PFS:File or PFS:Report, ea.	$ 125	$ 79
PFS: File & Report Combo	$ 195	$ 125
STONEWARE, DB Master	$ 195	$ 125
TELOS, File Vision	$ 195	$ 125
T/MAKER, Clickart	$ 50	$ 32
VIDEX, Vegas	$ 60	$ 34

BUSINESS SOFTWARE

	LIST PRICE	CONROY PRICE
ALS, Word or List Handler, ea.	$ 80	$ 36
Handler Pak, (Word/List/Spell)	$ 130	$ 80
APPLIED SOFT TECH., VersaForm	$ 389	$ 249
ARKTRONICS, Jane w/Mouse (II+/IIe)	$ 295	$ 195
Jane w/o Mouse (IIc)	$ 179	$ 119
ARTSCI, Magic Window II	$ 150	$ 100
ASHTON-TATE, dBase II (Req CP/M 80)	$ 495	$ 269
BPI, Job Cost	$ 595	$ 375
AR,AP,PR or INV,each	$ 395	$ 240
BRODERBUND, Print Shop	$ 50	$ 29
Print Shop Graphics Library	$ 25	$ 18
Bank St. Writer or Speller, ea.(spec +/e/c)	$ 70	$ 45
Bank St. Combo (Writer & Speller)	$ 140	$ 85
CONTINENTAL, GL,AR,AP or PR, each	$ 250	$ 165
CDEX, for Visicalc, Multiplan, Apple IIe,ea.	$ 60	$ 40
DOW JONES, Market Manager	$ 300	$ 189
Market Analyzer or Microscope, ea.	$ 350	$ 219
HAYDEN, Pie Writer (v 2.2)	$ 150	$ 89
HOWARD SOFT, Tax Preparer for '84 taxes	$ 250	$ 165
HUMAN EDGE, Sales Edge	$ 250	$ 165
Management Edge	$ 250	$ 165
LIVING VIDEOTEXT, ThinkTank	$ 150	$ 99
MECA, Managing Your Money	$ 200	$ 125
MEGAHAUS, Megawriter NEW	$ 100	$ 65
Megaworks NEW	$ 125	$ 75
MICRO PRO, WordStar™	$ 350	$ 189
WordStar w/Starcard	$ 495	$ 265
WordStar Professional, 4 Pak	$ 495	$ 265
MailMerge, SpellStar, or StarIndex, ea.	$ 99	$ 54
InfoStar and StarCard Combo	$ 595	$ 295
MICROSOFT, Multi-Plan (Ap DOS or CP/M)	$ 99	$ 69
OSBORNE/COMX, (Disk and Book)(Stats,Bus & Math)		
Some Common Basic Programs(75 ea.)	$ 100	$ 49
Practical Basic Programs(40 ea.)	$ 100	$ 49
PEACHTREE, Series 40, 3 Pak (GL,AR&AP)	$ 395	$ 239
QUARK, Word Juggler & Lexicheck (e or c)	$ 189	$ 129
SENSIBLE, Sensible Speller	$ 125	$ 79
SIERRA/ON-LINE, Homeword	$ 50	$ 45
General Manager II	$ 230	$ 155
ScreenWriter II, 2 Pak w/Dictionary	$ 130	$ 89
SOFTWARE ARTS, Visicalc IIe	$ 149	$ 99
SOFTWARE PUBL., (specify + or e for all)		
PFS:File	$ 125	$ 79
PFS:Write	$ 125	$ 79
PFS:Graph	$ 125	$ 79
PFS:Report	$ 125	$ 79
STONEWARE, DB Master v 4.0	$ 350	$ 225
DB Utility Pak I or II	$ 129	$ 82

UTILITIES SOFTWARE

BEAGLE, GPLE or Alpha Plot, each	$ 35	$ 27
Full line IN STOCK		CALL
BORLAND, Turbo Pascal	$ 55	$ 35
CENTRAL POINT Copy II Plus (bit copier)	$ 40	$ 25
Filer, Utility & Apple DOS	$ 20	$ 15
EINSTEIN/ALISON, Compiler	$ 129	$ 95
EPSON, Graphics Dump	$ 15	$ 9
FUNK, Sideways	$ 60	$ 40
HAYES, Terminal Prog. for Smartmodem	$ 100	$ 65
MICROSOFT, Full Line in Stock		CALL
OMEGA, Locksmith	$ 100	$ 75
PENGUIN, Complete Graphics System II	$ 80	$ 54
Graphics Magician	$ 60	$ 40
PHOENIX, Zoom Grafix	$ 40	$ 34
QUALITY, Bag of Tricks	$ 40	$ 29
UNITED SW1, ASCII Express-The Pro	$ 130	$ 82
UTILICO, Essential Data Duplicator III	$ 80	$ 49

HOME & EDUCATIONAL

BEAGLE BROS., Full line IN STOCK		CALL
BRODERBUND, Print Shop	$ 50	$ 34
CONTINENTAL, Home Accountant	$ 75	$ 49
DOW JONES, Home Budget	$ 95	$ 69
KOALA, Full line IN STOCK		CALL
MICROSOFT, Typing Tutor II	$ 25	$ 17
MONOGRAM, Dollars & Sense or S.A.M., ea.	$ 100	$ 59
SCARBOROUGH, Mastertype	$ 40	$ 27
Your Personal Net Worth	$ 80	$ 50
SIERRA/ON-LINE, Homeword	$ 50	$ 45
SIMON & SCHUSTER, Typing Tutor III	$ 50	$ 33

PLUS: **BARRONS, CBS, DAVIDSON, EDU-WARE, HARCOURT, LEARNING CO., TERRAPIN**

RECREATIONAL SOFTWARE

BLUECHIP, Millionaire or Squire, ea.	$ 50	$ 32
DATASOFT, Aztec or Zaxxon, each	$ 40	$ 27
ELECTRONIC ARTS, Sky Fox	$ 40	$ 29
Pinball or Music Const.,ea.	$ 40	$ 29
HAYDEN, Sargon III (Chess)	$ 50	$ 34
INFOCOM, Zork I, II, or III, ea.	$ 40	$ 27
ORIGIN, Ultima III	$ 60	$ 40
PENGUIN, Transylvania	$ 35	$ 24
PROFESSIONAL, Trivia Fever	$ 40	$ 25
SIERRA/ON-LINE, Ultima II	$ 60	$ 40
SUB LOGIC, Flight Simulator II	$ 50	$ 30

PLUS: **BRODERBUND, DATAMOST, INSOFT, MUSE, SIR-TECH, SPINNAKER**

DISKETTES

★ CONROY-LAPOINTE™ DISKETTES ★

We guarantee these top quality products with our name.
5 YEAR LIMITED WARRANTY. Discounts on orders w/o labels.

10 ea, SS/SD, (Apple, etc.) 35 Trk. comes w/flip pak		$ 12
100 ea, SS/SD, (Apple, etc.) 35 Trk.		$ 99
1000 ea, SS/SD, (Apple, etc.) 35 Trk.		$ 840
10 ea, DS/DD, (MAC, H/P) 3½"	NEW	$ 29
100 ea, DS/DD, (MAC, H/P) 3½"	NEW	CALL
1000 ea, DS/DD, (MAC, H/P) 3½"	NEW	CALL
10 ea, DS/DD, (IBM, H/P) 48 Trk. comes w/flip pak		$ 15
100 ea, DS/DD, (IBM, H/P) 48 Trk.		$ 119
1000 ea, DS/DD, (IBM, H/P) 48 Trk.		$ 859

★ CONROY-LAPOINTE™ ★
IBM PRE-FORMATTED

10 ea, DS/DD, 48 Track (IBM-PC Pre-formatted)	$ 19
100 ea, DS/DD, 48 Track (IBM-PC Pre-formatted)	$ 149
1000 ea, DS/DD, 48 Track (IBM-PC Pre-formatted)	$ 959

	LIST	CONROY
CDC, 10 ea, SS/DD, 40T (Apple, IBM)	$ 55	$ 19
100 ea, SS/DD, 40T (Apple, IBM)	$ 550	$ 195
10 ea, DS/DD, 40T (IBM, H/P)	$ 75	$ 23
100 ea, DS/DD, 40T (IBM, H/P)	$ 750	$ 295
DYSAN, 10 ea, SS/DD (Apple, etc.)	$ 40	$ 27
10 ea, DS/DD 48T (IBM,H/P)	$ 69	$ 35
MAXELL, 10 ea. SS/DD,MD1 (Apple)	$ 55	$ 19
10 ea. SS/DD, 3½" (MAC)	$ 60	$ 35
10 ea. DS/DD, MD2 (IBM)	$ 75	$ 26
10 ea. DS/DD Hi Dens(IBM-AT)	$ 77	$ 49
MEMOREX, 10 ea, SS/SD, 3½" (MAC)	$ 65	$ 35
10 ea, DS/DD Hi Dens (IBM-AT)	$ 84	$ 54
VERBATIM, 10 ea,SS/DD,MD515-01,(Apple)	$ 49	$ 27
10 ea, DS/DD, MD34 (IBM)	$ 84	$ 32
10 ea, SS/DD, 3½", (MAC)	$ 65	$ 35

★ GENERIK™ DISKETTES ★
Top quality, w/jackets, no labels.
90 day "No hassle money back guarantee."

100 ea., 35 Track (Apple, Atari)	$ 80
250 ea., 35 Track (Apple, Atari)	$ 199
1000 ea ,35 Track (Apple, Atari)	$ 750
100 ea., 48 Track (IBM, H/P)	$ 95
250 ea., 48 Track (IBM, H/P)	$ 229
1000 ea., 48 Track (IBM, H/P)	$ 829

MODEMS

	LIST	CONROY
ANCHOR, Signalman Mark XII (IBM)	$ 399	$ 259
HAYES, 2400B External Modem (IBM)	$ 899	$ 699
Smartmodem 1200B (IBM)	$ 599	$ 409
Smartcom II Software (IBM)	$ 149	$ 99
Stack Chronograph (RS-232)	$ 249	$ 189
Stack Smartmodem 300(RS-232)	$ 289	$ 219
Smartmodem 1200 (AP)	$ 699	$ 489
Micromodem IIe w/Smartcom (AP)	$ 329	$ 239
KENSINGTON, Modem 1200 (MAC)	$ 595	$ 385
NOVATION, J-Cat	$ 149	$ 104
ACCESS 1-2-3, 1200B+CrosstalkXVI(IBM)	$ 595	$ 369
Apple Cat II 300 B (AP)	$ 389	$ 249
212 Apple Cat, 1200 B (AP)	$ 725	$ 559
SmartCat Plus w/software (MAC)	$ 499	$ 379
PROMETHEUS, ProModem 1200B (IBM)	$ 399	$ 289
ProModem 1200 (MAC)	$ 549	$ 429
QUADRAM, Quadmodem, Internal (IBM)	$ 595	$ 425
Quadmodem, External (IBM)	$ 695	$ 495
VENTEL, PC Half Card (IBM)	$ 549	$ 389
1200 Plus, External (IBM)	$ 499	$ 429
PC1200, Internal (IBM)	$ 499	$ 379

MONITORS

	LIST	CONROY
AMDEK, Color 300 Comp/Audio	$ 349	$ 249
Color 500 Comp/VCR/RGB/Audio	$ 525	$ 395
Color 600 Hi Res, RGB /Audio	$ 599	$ 459
Color 700 Ultra Hi Res, RGB	$ 749	$ 549
Color 710	$ 799	$ 599
300G, 12" Green	$ 179	$ 129
300G, 12" Amber	$ 199	$ 149
310A, 12" Amber, (IBM)	$ 230	$ 159
PRINCETON, HX-12, Hi Res, RGB	$ 795	$ 495
SR-12, Hi Res, RGB	$ 799	$ 599
Scan Doubler for SR-12	$ 249	$ 179
MAX-12, Amber (monochrome)	$ 249	$ 199
QUADRAM, Amberchrome, 12" Amber	$ 250	$ 165
Quadchrome 12" RGB Color	$ 695	$ 495
Quadchrome II, 14" RGB Color	$ 650	$ 450
Quadscreen 17" 968x512 w/cable, Hi Res	$1995	$1595
ZENITH, ZVM122, 12" Amber	$ 159	$ 95
ZVM123, 12" Green	$ 149	$ 89
ZVM124, 12" Amber	$ 200	$ 149
ZVM135, 12" Color	$ 599	$ 499

PRINTERS

DOT MATRIX:

	LIST PRICE	CONROY PRICE
EPSON, RX80—100 cps	$ 269	CALL
RX80—F/T	$ 369	CALL
RX100—100 cps, 136 col., pin & fr.	$ 499	CALL
FX80—160 cps, 80 col.	$ 699	CALL
FX100—160 cps, 136 col.	$ 849	CALL
JX80—Color Printer, 160 cps	$ 399	CALL
LQ1500—200 & 67 cps	$1395	CALL
Tractor Feed for LQ1500	$ 70	CALL
MANNESMANN TALLY, Spirit—80 col., 80 cps	$ 269	$ 219
160—80 col., 160 cps	$ 798	$ 548
180—132 col., 160 cps	$1098	$ 778
OKIDATA, Okimate 20, Color, Hi Res	$ 268	$ 208
82A—80 col., 120 cps, para.	$ 349	$ 319
83A—132 col., 120 cps, para.	$ 749	$ 599
84—136 col, 200 cps, para.	$ 899	$ 729
92—80 col., 160 cps, para.	$ 499	$ 399
93—136 col., 160 cps, para.	$ 799	$ 649
2410P—Pacemark, 350cps, para.	$2995	$1975
QUADRAM, Quadjet, Inkjet Color Printer	$ 895	$ 795
STAR MIC., Gemini, 120cps, 10"	$ 499	$ 269
Gemini, 120cps, 15"	$ 549	$ 419
TOSHIBA, Prop. spacing & Hi-res graphics		
1351—192 cps(DQ) & 100 cps (LQ)	$1895	$1375
1340—144 cps(DQ) & 54 cps(LQ)	$ 995	$ 795
Bi-directional Tractor Feed	$ 195	$ 175
TTX, TTXpress, portable/handheld,40cps	$ 229	$ 129

LETTER QUALITY:

JUKI, 6300—40 cps, para	$ 995	$ 795
6100—18 cps, para, 3 pitch	$ 599	$ 439
TOSHIBA, Prop. spacing & Hi-res graphics		
1351—192 cps(DQ) & 100 cps (LQ)	$1895	$1375
1340—144 cps(DQ) & 54 cps(LQ)	$ 995	$ 795
TTX, 1014—13 cps, para/ser, p & fr, 3p.	$ 499	$ 365
1114—same as 1014 w/T&F, 2c & prop.	$ 599	$ 439

PLOTTERS:

AMDEK, Amplot II, 6 pen, 10 x 14	$1099	$ 899

PRINTER SUPPLIES:

Paper, Ribbons, Daisy Wheels.	CALL

PRINTER INTERFACES & BUFFERS

	LIST	CONROY
ARBO, IBM-PC to Para Printer Cable	$ 60	$ 30
EPSON, Parallel Interface for LQ1500	$ 100	$ 79
Serial Interface Board	$ 130	$ 105
ASSIM PROC, Mac to Epson Conn I/F	$ 89	$ 69
MPC, AppleII I/F & Cable for Epson & Gemini	$ 95	$ 59
OKIDATA, Plug 'n Play, Tractors, Okigraph,ea.	$ 50	$ 42
ORANGE MICRO, Grappler Plus for Apple	$ 149	$ 99
Serial Grappler	$ 119	$ 79
Buffered Grappler Plus, 16K	$ 239	$ 159
PRACTICAL, Microbuff In-Line 64K,para.	$ 349	$ 259
Microbuff In-Line 64K,ser.	$ 349	$ 259
QUADRAM, Microfazers, full line in STOCK		CALL

CABLES

ARBO, IBM-PC to Modem Cable	$ 31	$ 21
IBM-PC to Para Printer Cable	$ 60	$ 30
ASTAR, RF Modulator for T.V.(Apple)	$ 35	$ 20
CURTIS, Monitor Extension Cable (IBM)	$ 50	$ 35
3'-9" Keyboard Extens. Cable (IBM)	$ 40	$ 30
RCA, Monitor Cable	$ 15	$ 9

ACCESSORIES

CURTIS, Diamond, 6 outlets, switched	$ 50	$ 29
Emerald, 6 outlets, 6' cord	$ 60	$ 35
Ruby, 6 outlets, 6' cord, filter	$ 90	$ 52
Sapphire, 3 outlets, w/filter	$ 80	$ 46
EPD, Lemon, 6 outlets/wall	$ 50	$ 29
Lime, 6 outlets/cord	$ 90	$ 45
Orange, 6 outlets/cord	$ 140	$ 60
Peach, 3 outlets/wall	$ 98	$ 39
Kiwi, 1 outlet/wall		CALL
INNOVATIVE, Flip-n-File 10 (disk holder)	$ 7	$ 4
Flip-n-File 50 (disk holder)	$ 22	$ 15
KENSINGTON, Masterpiece (IBM)	$ 140	$ 99
System Saver Fan (Apple)	$ 90	$ 69
NETWORX, Wiretree, 4 outlet, w/filt & surge	$ 70	$ 39
PERFECT DATA, Head Cleaning Kit	$ 16	$ 12
PROD TECH INT'L, Uninterruptable Power Supply		
200 Watts, PC200 for IBM-PC	$ 499	$ 39
300 Watts, XT300 for IBM-XT	$ 359	$ 279
800 Watts, AT800 for IBM-AT, 72 lbs.		CALL

CONROY-LAPOINTE CREDIT CARD

Send me a Conroy-LaPointe credit application form, so I can get cash discount prices with credit card convenience. $400 Minimum initial purchase

SIGN _____ NAME _____ ADDRESS _____ CITY _____ STATE _____ ZIP _____

MAIL TO: *12060 SW Garden Place, Portland, OR 97223*

ORDERING INFO & TERMS:

MAIL TO: 12060 SW Garden Place, Portland, OR 97223 —— Include your telephone number; double check your figures for Shipping, Insurance and Handling (SIH). All items usually in stock. **NO C.O.D.** Cashiers checks, money orders, Fortune 1000 checks and government checks honored immediately. Personal and other company checks—allow 20 days to clear. Prices reflect **3% cash & Conroy-LaPointe Credit Card discount**, so ADD 3% to above prices for VISA/MasterCard/American Express. Your card is NOT charged till we ship. Add **$10 CHARGEBACK** for returned checks. **SHIPPING:** U.S. Mainland, 3% ($5 minimum) for standard UPS ground; UPS Blue, 6% ($10 minimum); for U.S. Postal, APO or FPO, 6% ($10 minimum). Alaska & Canada—Postal. Foreign orders except Canada, 18% ($25 minimum). Monitors by Postal or to foreign countries, 30% ($50 minimum). Orders received with insufficient SIH charges will be refunded. All prices, availability and specifications subject to errors or change without notice, no call to verify. All goods are new, include warranty and are guaranteed to work. Due to our low prices and our assurance that you will get new, unused products—**ALL SALES ARE FINAL.** We do not guarantee compatibility. Call before returning goods for repair or replacement. **ORDER DESK HOURS——8AM to 6PM PST, Monday through Friday, Saturday 10 to 4.** (8AM here is 9AM in New York.) *ExpressMail™, Postaxpress™, and Xmark™ are trademarks of Cuneit Corporation.*

LA POINTE INC.SM

#C16

SAVE 25% - 75% OFF LIST !!!

© 1984 by Conroy-LaPointe, Inc. All Rights Reserved

ORDER NOW (800) 547-1289

FOR YOUR IBM-PC, XT, AT or JR

COMPUTER SYSTEMS

— Call for Details —

256K IBM - PC

360K Disk Drives by CDC

90 Day Limited Warranty By Us

SM

SANYO 555-2.

256K, 2 320K Disk Drives — CALL

ZENITH Z150,

256K, 2 320K Disk Drives, MS DOS 2.1, 8088 Chip, 2 S/P — CALL

HARD DISKS

Kits are completely engineered to work with DOS 2.0/2.1. Easy to install. Includes Hard Disk, Controller Card and Instructions

	LIST	CONROY
KAMERMAN, External 10 meg kit	$1295	$1095
Megaflight 100, Internal 10 meg kit	$ 895	$ 795
Masterflight, 20 meg, tape, surge prot.	$3095	$2495
MAYNARD, Internal 10 meg kit, (WS1)	$1595	$1150
QUADRAM, Quaddisks Int. w/controller, Full Line		CALL
RANA, External 10 meg w/controller	$1495	$1095
Internal 10 meg w/controller	$ 995	$ 795

FLOPPY DISK DRIVES

CDC, Limited 30 day warranty; Call for quantity prices.

Full Height $149

Half Height, $129

MAYNARD, Controller Card w/para port	$ 300	$ 185
Controller Card w/serial port	$ 310	$ 195
Sandstar Cont Card (accepts 3 modules)	$ 265	$ 205
PERFECT DATA, Head Cleaning Kit	$ 16	$ 12

OTHER HARDWARE

	LIST PRICE	CONROY PRICE
AST,		
SixPak Plus, 64K		$245
SixPakPlus, 256K, S/P/CC+S/W	$ 695	$ 395
SixPakPlus, 384K, S/P/CC+S/W	$ 895	$ 465
Game Port for SixPak	$ 50	$ 39
Preview™ Graphics Card w/para, 64K	$ 399	$ 299
Advantage™, Multif. Bd for AT	$ 595	$ 445
I/O Plus II, S/P/CC	$ 215	$ 150
I/O Plus II, S/P/CC/G	$ 265	$ 185
I/O Plus II, 2S/P/CC/G	$ 315	$ 215
MonoGraphPlus™ P/CC (forLotus)	$ 495	$ 375
PCNet, Starter Kit, PC002	$1090	$ 790
PCNet, Circuit Board, PC001	$ 695	$ 365
ComboPlus Products IN STOCK		CALL
MegaPlus Products IN STOCK		CALL
COMX, NEW		
Econo RAM Plus™, 384K to 1.5 meg. board, S/P/CC/G, Fastrak™ & Spooler		$395
EconoRAM™, full 384K board	$ 595	$ 325
CURTIS, UNI-I, Monitor tilt/swivel base	$ 50	$ 39
3-9 foot Keyboard Extension Cable	$ 40	$ 30
HAUPPAGE (HCW), 8087 Chip	$ 175	$ 149
8087 Math Pak (Chip & Softw)	$ 295	$ 235
8087 Software Pak	$ 180	$ 138
8087 Macro Pak	$ 245	$ 195
HAYES, Mach II Joystick	$ 45	$ 29
HERCULES, Color Card w/para. Mono Graphics Card	$ 245	$ 169
	$ 499	$ 329
KAMERMAN, External Power Supply	$ 395	$ 295
KENSINGTON, Masterpeice™ PC Saver™ Line Cord w/Filter	$ 140	$ 99
	$ 50	$ 35
KEY TRONIC, KB5151, Std. keyboard	$ 255	$ 195
KB5150, Std. keyboard	$ 209	$ 159
KOALA, Speed Key System	$ 100	$ 63
Speed Key Tables w/software	$ 200	$ 139
Koala Pad™ w/PC Design Programmer's Guide	$ 150	$ 89
	$ 15	$ 14
MAYNARD, SAND STAR SERIES		
Multifunction (6) Card	$ 89	$ 79
Memory Card no RAM	$ 199	$ 169
Memory Card 256K	$ 495	$ 395
Floppy Cont. Card, accepts 3 modules	$ 265	$ 205
HardDisk I/F Module	$ 499	$ 399
HardDisk Cable	$ 30	$ 27
Serial Port Module	$ 95	$ 79
Para or Clock Cal. Module, ea.	$ 59	$ 49
Game Adapter Module	$ 49	$ 43
Memory Module, OK	$ 122	$ 99
Memory Module 256K	$ 422	$ 357
10 meg Hard Disk Kit & Cont Card	$1595	$1150

OTHER HARDWARE

	LIST PRICE	CONROY PRICE
MICROSOFT, Mouse for PC	$ 195	$ 139
System Card, 64K	$ 395	$ 275
System Card, 256K	$ 625	$ 450
MOUSE SYSTEMS, PC Mouse & Paint	$ 295	$ 189
PARADISE, Modular Graphics Card	$ 395	$ 285
Parallel or Serial Port, ea.	$ 95	$ 65
PERSYST, NEW		
PC/Mono Board, w/para port	$ 250	$ 195
PC/Color Graphics Bd w/light pen & I/F	$ 244	$ 178
BOB Board™ Color Adapter, hi res	$ 595	$ 465
PLANTRONICS,		
Color Bd & Colormagic, 16 color w/Para	$ 559	$ 395
Color Bd & Draftsman, 16 color w/Para	$ 559	$ 395
QUADRAM,		
Quadboard 64K, to 384K, S/P/CC/G	$ 395	$ 245
Quadboard, no RAM, expand to 384K	$ 295	$ 225
Quadboard 256K, to 384K, S/PCC	$ 675	$ 395
Quadboard, 384K, S/P/CC/G	$ 795	$ 495
Quadboard II, no RAM, to 256K	$ 295	$ 215
Quadboard II, 64K, to 256K, 2S/CC	$ 395	$ 265
Quadboard II, 256K, 2S/CC	$ 595	$ 395
Quad 512 + 64K w/serial port	$ 325	$ 265
Quad 512 + 256K w/serial port	$ 550	$ 420
Quad 512 + 512K w/serial port	$ 895	$ 625
Quadcolor I, board, 4 colors	$ 295	$ 195
Upgrade Quadcolor I to II kit	$ 275	$ 199
Quadvue, board, Mono, S/P/CC	$ 345	$ 269
Quadchrome Monitor, 12" RGB Color	$ 795	$ 495
Quadchrome II Monitor, 14" RGB Color	$ 650	$ 450
Amberchrome Monitor, 12" Amber	$ 250	$ 165
Quad 3278	$1195	$1050
Quadnet VI	$2295	$1545
Quadnet IX	$1995	$1745
Quadlink	$ 495	$ 385
TG PRODUCTS, Joystick	$ 45	$ 29
TITAN, Accelerator PC (8086+ 128K)	$ 995	$ 750
WICO, Smartboard Keyboard	$ 400	$ 279

★★ FOR YOUR PC-JR ★★

	LIST PRICE	CONROY PRICE
KEY TRONIC, KB5151 Jr. Keyboard	$ 255	$ 195
KOALA, Touch Tablet for Jr.	$ 125	$ 75
MOUSE SYSTEMS, Mouse for Jr.	$ 195	$ 125
MICROSOFT, 128K Booster w/Mouse	$ 495	$ 329
Serial Mouse	$ 195	$ 139
QUADRAM, Quadmemjr.(128K-512K,P/CC)	$ 275	$ 215
Quadjr. Expansion Chassis	$ 695	$ 540
TECMAR, Jr. Captain	$ 395	$ 345

★ 256K ★ CHIP KIT

$149

9 Each, 4256 chips 150 ns

$18 ea.

4256 chip, 150 ns

★ 64K ★ CHIP KIT

$29

9 Each, 4164 chips

90 Day Warranty by us

PRICES ARE DROPPING, SO CALL!

NEW!

★ ComX ★ EconoRAM Plus™

$395

384K Multifunction RAM Board expandable to 1.5 Megabyte

Works like AST SixPakPlus™ with capacity for up to 1.5 meg, game port, Fastrak™ RAM Disk and Spooler Software.

EconoRAM™ 384K Single Function Board

$325

With Fastrak™ and Spooler.

Fully Compatible, 1 Year Limited Warranty.

Works on DOS 1.1, 2.0 or 2.1

Prices and availability subject to change. Call.

SOFTWARE FOR YOUR IBM-PC, XT, AT or JR

BUSINESS

	LIST PRICE	CONROY PRICE
APPLIED SOFTWARE, VersaForm	$ 389	$ 249
ASHTON-TATE, Framework	$ 695	$ 345
dBase III	$ 695	$ 360
dBase II, (req. PC-DOS & 128K)	$ 495	$ 289
dBase II to III upgrade	$ 200	$ 119
ATI, Training Programs—Large Inventory	$ 75	$ 50
BPI, Job Cost Accounting	$ 795	$ 495
Gen'l Acctg, AR, AP or PR, each	$ 595	$ 375
BRODERBUND, Bank St. Writer(PC or Jr)	$ 80	$ 50
CDEX, Training Programs—Large Inventory	$ 70	$ 45
CONTINENTAL, Ultrafile (PC)	$ 195	$ 125
Tax Advantage (PC or Jr)	$ 70	$ 45
FCM (Filing, Cataloging, Mailing)(PC)	$ 125	$ 75
Property Management (PC)	$ 495	$ 295
DOW JONES, Investment Evaluator	$ 139	$ 99
Market Manager Plus	$ 300	$ 159
Market Analyzer	$ 350	$ 219
Market Microscope	$ 350	$ 219
Spread Sheet	$ 249	$ 159
FOX & GELLER, dUtil (DOS or CP/M86)	$ 99	$ 65
Quickcode or dGraph, each	$ 295	$ 165
HARVARD, Total Project Manager	$ 495	$ 315
Harvard Project Manager	$ 395	$ 239
HAYDEN, Pie Writer	$ 200	$ 125
Pie Speller	$ 50	$ 30
HOWARDSOFT, Tax Preparer for '84	$ 295	$ 195
Real Estate Analyzer	$ 250	$ 170
HUMAN EDGE, Mind Prober (PC or Jr)	$ 50	$ 32
Communications Edge (PC)	$ 195	$ 119
Sales Edge	$ 250	$ 159
Management Edge	$ 250	$ 159
Negotiation Edge	$ 295	$ 185
IUS, EasyWriter II System	$ 350	$ 250
EasySpeller II	$ 85	$ 125
GL, AR, AP, OE or INV, each	$ 595	$ 375
KENSINGTON, Easy Link Mail Manager	$ 95	$ 59
LIFETREE, Volkswriter Deluxe	$ 395	$ 159
Volkswriter	$ 195	$ 105

BUSINESS

	LIST PRICE	CONROY PRICE
LIVING VIDEOTEXT, Think Tank	$ 195	$ 105
LOTUS, 1-2-3	$ 495	$ 309
Symphony	$ 695	$ 465
MDBS, Knowledgeman	$ 500	$ 300
MECA, Managing Your Money	$ 195	$ 125
MICROPRO, WordStar™ (PC)	$ 350	$ 189
WordStar™ (Jr)	$ 195	$ 115
WordStar 2000	$ 495	$ 295
WordStar 2000 Plus	$ 595	$ 325
WordStar Professional Plus	$ 695	$ 395
WordStar Professional, 4 Pak	$ 495	$ 265
MailMerge, SpellStar or StarIndex, ea.	$ 99	$ 54
ProOptions Pak (MM/SS/SI)	$ 195	$ 105
InfoStar Plus (+ Starburst)	$ 595	$ 315
CorrectStar	$ 145	$ 77
MICRORIM, RBase Series 4000	$ 495	$ 269
Extended Report Writer	$ 150	$ 95
RBase Clout	$ 195	$ 125
MICROSOFT, Spell	$ 50	$ 32
Multiplan (PC or Jr)	$ 195	$ 125
Chart or Project, each	$ 250	$ 159
Word	$ 375	$ 235
Word with Mouse	$ 475	$ 289
MONOGRAM, Dollars & Sense w/Forecast	$ 180	$ 110
MULTIMATE, Multimate Ver. 4.0	$ 495	$ 295
OPEN SYS, GL,AR,AP,PR,INV or PO,ea.	$ 695	$ 420
PEACHTREE, Back to Basics GL	$ 295	$ 175
Peach Pak	$ 395	$ 225
Peach Text 5000	$ 395	$ 225
QUADRAM, Tax Strategy	$ 395	$ 295
Investment Strategy	$ 395	$ 295
QUE, Using 1-2-3	$ 15	$ 12
1-2-3 for Business	$ 15	$ 12
Using Symphony	$ 20	$ 15
SAMNA, Word Plus	$ 295	$ 185
SATELLITE, WordPerfect (PC)	$ 495	$ 235
WordPerfect (Jr)	$ 69	$ 49
SOFTW. ARTS, TK Solver(specif DOS)	$ 399	$ 269
SOFTWARE INT'L, Open Access	$ 695	$ 395

BUSINESS

	LIST PRICE	CONROY PRICE
SOFTWARE PUBL, PFS:Report	$ 125	$ 79
PFS:File	$ 140	$ 89
PFS:Write	$ 140	$ 89
PFS:Graph	$ 140	$ 89
PFS:Plan	$ 140	$ 89
PFS:Proof or PFS:Access, each	$ 95	$ 59
SORCIM, SuperCalc III	$ 395	$ 245
STONEWARE, Advanced DB Master	$ 595	$ 395
THORN/EMI, Perfect Writer (PC)	$ 349	$ 179
Perfect Combo (Writer & Speller) (PC)	$ 399	$ 199
Perfect Combo (Jr) (Write/Spell/Thesaus	$ 139	$ 89
VISICORP, VisiCalc 4	$ 250	$ 159
WARNER, Desk Organizer (PC or Jr)	$ 195	$ 125

UTILITIES

	LIST PRICE	CONROY PRICE
BORLAND, Sidekick (PC or Jr)	$ 55	$ 35
Sidekick (Copiable) (PC or Jr)	$ 85	$ 55
Turbo Pascal (PC or Jr)	$ 55	$ 35
Toolbox (PC)	$ 55	$ 35
CENTRAL POINT, Copy II PC	$ 40	$ 30
COMX, Fastrak™: RAM/Disk emulator & printer spooler. For any PC/DOS or RAM Card. Menu Driven	$ 100	$ 59
DIGITAL RES., CP/M-86™ (PC/XT)	$ 80	$ 39
CBASIC 86™ (CP/M-86)	$ 200	$ 135
CBASIC Compiler(CP/M-86 or PCDOS, ea)	$ 600	$ 395
Concurrent CP/M-86™ w/windows	$ 835	$ 225
PL/1 (PC DOS)	$ 750	$ 495
Speed Prog. Pkg. (CP/M-86)	$ 200	$ 135
DR LOGO-86 (CP/M-86)	$ 100	$ 69
EPYX, In Stock		CALL
FUNK SOFTWARE, Sideways	$ 60	$ 40
HAYES, Smartcom II (Data Comm.)	$ 149	$ 99
LIFEBOAT, Lattice C	$ 500	$ 295
MICROSTUF, Crosstalk XVI (PC or Jr)	$ 196	$ 129
MICROSOFT, Macro Assembler	$ 100	$ 69
BASIC Compiler	$ 395	$ 259
Business BASIC Compiler	$ 600	$ 300
C Compiler	$ 395	$ 259
COBOL Compiler	$ 700	$ 459
FORTRAN Compiler	$ 350	$ 229
PASCAL Compiler	$ 300	$ 199

UTILITIES

	LIST PRICE	CONROY PRICE
MOUSE SYSTEMS, PC Paint	$ 99	$ 69
NORTON, Utilities (14 prgms) New Version	$ 100	$ 65
OPEN SYSTEMS, BASIC Interpreter	$ 195	$ 130
ROSESOFT, Prokey	$ 130	$ 79
WESTERN UNION, Easy Link Mail Mngr	$ 95	$ 65

HOME & EDUCATIONAL

ARMONK, Executive Suite	$ 40	$ 27
BPI, Personal Accounting	$ 99	$ 63
CONTINENTAL, Home Accountant (Jr)	$ 75	$ 59
Home Accountant Plus (PC)	$ 150	$ 90
DOW JONES, Home Budget	$ 139	$ 92
KOALA, Graphics Exhibitor (Jr)	$ 40	$ 25
MONOGRAM, Dollars & Sense w/forecast	$ 165	$ 110
SCARBOROUGH, MasterType(PC or Jr)	$ 50	$ 32
Your Personal Net Worth	$ 100	$ 63
SIMON & SCHUSTER, Typing Tutor III	$ 50	$ 33

PLUS: **BPI, CBS, COMPREHENSIVE, DAVIDSON, HARCOURT, PBL CORP.**

RECREATIONAL

BLUECHIP, Millionaire, Barron, Tycoon, ea.	$ 60	$ 39
BRODERBUND, Large Inventory In Stock		CALL
ELECTRONIC ARTS, Large Inventory In Stock		CALL
HAYDEN, Sargon III (Chess)	$ 50	$ 34
INFOCOM, Large Inventory In Stock		CALL
MICROSOFT, Flight Simulator (PC or Jr)	$ 50	$ 33
ORIGIN, Ultima III (PC or Jr)	$ 60	$ 39
PROFESSIONAL, Trivia Fever (PC or Jr)	$ 40	$ 25
SPECTRUM HOLOBYTE, Gato	$ 40	$ 25
SPINNAKER, President's Choice, Amazon, Fahrenheit, Rendevouz, Dragon, each	$ 40	$ 25
SUB LOGIC, Night Mission Pinball	$ 40	$ 27

CASH-n-CARRY COMPUTER STORES, INC.

Retail Sales only. Call stores for local hours.

SAN FRANCISCO — 550 Washington Street (at Montgomery, opposite the Pyramid). Interstate 80, to Highway 480; take Washington Street Exit. **CALL (415) 982-6212.**

PORTLAND, OREGON — At Park 217, Tigard at intersection of Highways 217 and 99W. **CALL (503) 620-5595.**

SEATTLE, WASH. — 3540 128th Ave. SE, Bellevue 98006. In Loehmann's Plaza near Factoria Square, SE of Highway 405 & 90 and at SE 36th and Richards. **CALL 641-4736.**

OUR REFERENCES:

We have been in computers and electronics since 1958, a computer dealer since 1978 and in computer mail order since 1980. Banks: 1st Interstate Bank, (503) 643-4678. We belong to the Chamber of Commerce (503) 228-9411, and Direct Marketing Association, or call Dunn and Bradstreet if you are a subscriber. Recipient of 1984 OREGON BUSINESS MAGAZINE AWARD.

MasterCard VISA CONROY-LAPOINTE CARD

NO SALES TAX

CALL (800) 547-1289

In Oregon: (800) 451-5151

TELEX: 910 380 3980

Foreign & Portland Residents Call (503)620-9877

QUESTIONS on your order (503) 620-9878 WEEKDAYS ONLY

ORDER DESK HOURS

Mon-Fri—8AM to 6PM PST

Saturday—10AM to 4PM PST

(6AM here is 9AM in New York)

CIRCLE 114 ON READER SERVICE CARD

Howard W. Sams & Co., Inc

Believing that computer literacy also requires the ability to read and comprehend printed media, this company takes the approach that an educational package consists of a full-length book supplemented with a disk or tape cassette containing program material the reader would otherwise need to enter by hand. Among the offerings is the *Trivia Data Base* series which uses the popular trivia motif as the method of teaching database program structure. This "Combo Pack" contains two separate programs, the first a database management system, and the second a game for one to four players which accesses that data and scores points for prompt and correct responses. Ages child to adult can learn structured programming and Logo syntax with *88 Apple Logo Programs* which contains ready-to-run database and graphing packages for home, business, and school. Other programs are designed for ages 10 to 14.

System: Apple II, C64, Atari

Address:

4300 W. 62nd St.
Indianapolis, IN 46206
(317) 298-5566
(800) 428-SAMS

Human Engineered Software

HES's human engineers are promoting the spread of disease among microcomputers, but the epidemic can be brought under control by 10-year-olds using *Cell Defense*, a biology program that simulates the effects of virus, age, stress, drugs, and alcohol on individual cells. Users control the body's defense system to ward off infections and tissue damage by choosing from a variety of defenses including interferon, macraphages and antibodies. Another interactive, simulation program, *Ocean Quest*, challenges players to roam the seven seas in a research submarine, collecting data on marine life while searching for shipwrecks, sunken treasure, and lost torpedos.

System: Apple II, C64

Address:

150 North Hill Dr.
Brisbane, CA 94005
(415) 468-4111

IBM

With programs developed specifically for the IBM PCjr ranging from an earth science series to games that build logic skills, Big Blue is offering special school prices to introduce its products to teachers and other fulltime faculty members. Its *Writing to Read* system is a complete language laboratory for teaching kindergarten and first grade children to read and write. Prior to the introduction of the program, more than 22,000 children participated in a full scale testing and evaluation of the system. IBM also produces an Electric Literature series that includes the *Electric Poet*, a program of animation and musical lessons created for language arts, social studies, science, and math. In conjunction with the *Poet, Comma Cat* uses poetry, color, animation, and music to teach the appearance and use of punctuation marks. *Dictionary Dog* teaches children how to alphabetize words and to use the dictionary.

System: IBM PC, PCjr.

Address:

P. O. Box 1328
Boca Raton, FL 33432
(305) 982-3474

Imagic

An enterprising crook could chat with his computer, repair his car on the way to a heist and preside at his own trial with this company's line of software. *Speak and Seek* is a vocabulary building program for children 2 to 7 years old that uses speech synthesis programming instead of specialized hardware to create talkative, animated letters. *Injured Engine* takes older children and their computers under the hood of a car to learn about operation and maintenance. *Crime and Punishment* draws on actual case histories to present criminal trials, examine evidence and testimony, analyze defendants' records of arrests and convictions, and determine sentences.

System: IBM PC, Apple II, C64

Address:

981 University Ave.
Los Gatos, CA 95030
(408) 399-2200

Krell Software Corporation

For career-oriented adults who need to review grammar and English usage, and students who are preparing for junior high, high school, and college entrance exams, Krell offers *Grammar, What Big Teeth You Have*, a diagnostic and instructional program that covers grammar, style, punctuation, and spelling. A complementary package, *The Devil and Mr. Webster*, uses a tutoring and game format to teach roots, prefixes, foreign words, and 9000 essential vocabulary words. Krell also produces preparation packages for the SAT, ACT, GMAT, LSAT, and NTE, with SAT and ACT programs offering a money-back guarantee of an 80-point SAT score increase and a 10% ACT score increase. For young learners, *Kinderlogo* introduces Logo programming language for teaching computer literacy.

System: IBM PC, Apple, C64, Atari, TRS-80

Address:

1320 Stony Brook Rd.
Stony Brook, NY 11790
(516) 751-5139
(800) 245-7355

The Learning Company

Designing programs in series so students progress from one to the next, TLC produces a wide range of educational software in logic and thinking skills, reading, math, and art and creativity. An electronic erector set that builds logic machines and simulated computer circuits, *Rocky's Boots* for ages 9 and up is an introductory logic course in which the player becomes a builder and inventor, tinkering and experimenting in an interactive environment. Teenagers and young adults can build a robot, design integrated circuitry and microchips and learn the applications of Boolean logic in *Robot Odyssey I*, an adventure game that combines action and education. Players develop problem-solving skills, including analysis of information, hypothesis formulation, and logical thinking. Other TLC software includes reading programs for ages 3 to 10, math for ages 4 to 13, and art and creativity for ages 3 to 6.

System: IBM PC, Apple II, C64, Atari

Address:

545 Middlefield R., Suite 170
Menlo Park, CA 94025
(415)328-5410

MECA

An interactive, self-paced tutorial designed to introduce novices 12 to adult to Basic programming, *Basic Building Blocks* demonstrates Basic commands, including disk access, sound, and graphics. More than 60 programs are executed for study to teach program structure and flow of control. In addition, users can write and test their own programs, tracing the flow one line at a time to detect er-

rors. Values for up to 16 variables can be displayed and breakpoints set by line number or variable number.
System: Apple, Atari, IBM PC
Address:
285 Riverside Dr.
Westport, CT 06880
(203) 222-1000

Methods & Solutions, Inc.

Based on the theory that children view school as a job and reject tutorial educational programs for use at home as being part of the workday even when presented on a computer, the Mindplay series incorporates learning into a variety of information-laden games to attract and maintain interest and enthusiasm. The software also is adjustable by teacher or parent according to the motor skills and educational progress of the individual child. *Race the Clock*, for ages 5 to 12, is designed to sharpen memory and thinking skills as the user races against time to match pictures, words, and word-picture combinations. Children aged 4 to 9 can knock down walls and slay an assortment of monsters in the addition and subtraction game, *Math Magic*, which includes performance summaries and customizing features. Story and coloring books can be created by children ages 4 and up with *Picture Perfect*. For children 7 to 11 who would like to eat their words, the diet can be made palatable with *Bake & Taste*, a program that teaches how to measure and follow directions.
System: IBM PC, Apple II
Address:
82 Montvale Ave.
Stoneham, MA 02180
(617) 438-5454

Micro Lab

The Micro Learn Tutorial Series uses two basic modes in its educational programs, a tutorial mode in which answers to questions are explained immediately after a choice is made, and a test mode in which questions are answered without help and then scored on the basis of the percentage of correct answers. Missed questions are regiven after scoring. *American History*, ages 7 to adult, covers 1865-1912 with topics including reconstruction, industrial growth, urban growth, and foreign policy. Seventh through twelfth graders explore exponents, scientific notation, and problem solving in *More Power to You*. Stories of monsters, superstitions, and magical happenings develop comprehensive reading skills in *Myths, Magic and Monsters* for grades 5 to 8.
System: IBM PC, Apple II, C64, Atari
Address:
2699 Skokie Valley Rd.
Highland Park, IL 60035
(312) 433-7550

Mindscape, Inc.

A new series for young children and a real-time space program are the newest entries in this company's line of educational and entertaining games. *The Halley Project: A Mission in Our Solar System* is a solar system simulation that takes teen to adult players through a series of tests and obstacles while imparting information on gravity, orbital motions, and sizes and positions of planets, comets and moons; location of constellations; and how eclipses occur. Children 4 to 8 years old help Tonk search for robot parts in Buddy-Bot land in *Tonk in the Land of Buddy-Bots*, one of five educational games in the Tink!Tonk! series designed to develop concentration, visual discrimination, and critical thinking skills over a range of five difficulty levels.
Systems: IBM PC, Apple II, C64, Atari
Address:
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667

Minnesota Educational Computing Corporation

With more than 300 software programs listed in its 94-page catalog, MECC is one of the industry leaders in developing a wide variety of educational materials for home and school use. A new science package, *Discovery Lab* introduces students to science processes by predicting, observing, and collecting information. For grades five to nine, two interactive tutorials, *Diagonals* and *Squares* in the Problem-Solving Strategies series, detail the strategies of trial and error, exhaustive listing, and simplification of the posed problem. Students collect data, create charts, find patterns, and make generalizations as the strategies are applied to graphically presented puzzle problems. Young Commodore 64 tyros can learn the ins and outs of the system with *The Friendly Computer* and the *Term Worm*, a program that graphically displays the major components of the computer innards. Many MECC software packages are also available directly from Radio Shack.
System: IBM PC, Apple II, C64, TRS-80, Atari
Address:
3490 Lexington Ave. N.
St. Paul, MN 55112
(612) 481-3500

Muse Software

Muse is a company that actually says it wants to turn children into addicts—education addicts who enjoy the experience of learning. Taking its lead from the news headlines, the company puts young players into the middle of a nuclear power plant with *Three Mile Island*, where the general manager must supply electricity to customers while preventing radiation leaks, interruption of service, and most important, a meltdown. More cerebral is *Intellectual Decathalon*, an Olympic brain-against-the-clock race designed to stimulate powers of observation, memorization and competition for ages 6 to adult. Mathematical functions over a wide range of variables in alegbra and calculus are presented in *The Functional Game* which explores the association between graphs of functions and their mathematical equations for high school and college level students. Losers here can always refresh their knowledge of *Elementary Math* in a program of basic arithmetic for 6- to 13-year olds designed to supplement homework assignments.
System: Apple II
Address:
347 Charles St.
Baltimore, MD 21201
(301) 659-7212

Olympus Educational Software

Featuring color and graphics capabilities, Infinite Math Workbook Series offers 14 programs covering three years of high school math curriculum, including functions and graphing, geometry, linear equations, and statistics. Each program provides instruction, review, examples, and scoring. After a user's third unsuccessful attempt to solve a problem, the program provides both the solution and detailed explanations of the mathematical process. Highly tutorial, these programs may be used in classrooms as supplements to the on-going curriculum or as reviews in independent study. Accompanying booklets act as mini-textbooks, each providing a discussion of a specific area of mathematics.

System: Apple II, C64
Address:
1660 North Hotel Circle Dr.
Suite 310
San Diego, CA 92108
(619) 296-8475

Prentice-Hall

Developed by Arrakis Advantage for Prentice-Hall, *Algebra I, Geometry*, and *Chemistry* are the first in a series of interactive math and science programs that eventually will include volumes of biology, physics, and statistics. Students are allowed to interrupt to ask questions, request examples, or review material and can use two different testing techniques to prepare for classroom exams. Each program covers a specific set of key topics: sets and their notation, types, operations, and relationships in *Algebra I*, Volume 1; applications, measure, basics of geometry, relations, and transformations in *Geometry*, Volume 1; and atomic models, Dalton's atomic theory, and electron configurations in *Chemistry*, Volume 1. Animated color graphics, simulations, and sound are designed to create interest and enthusiasm in high school students.

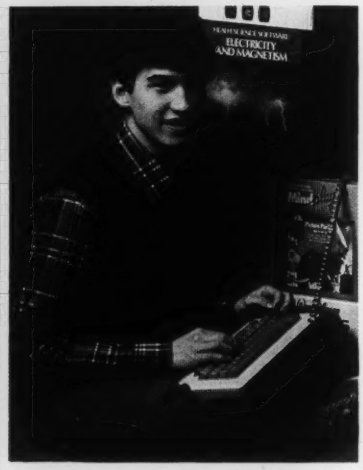
System: IBM PC, PCjr, Apple IIe, Atari, C64
Address:
Englewood Cliffs, NJ 07632
(800) 624-0024

Quality Educational Designs (QED)

Self-paced tutoring and game-explorations are combined in four interactive programs that introduce, instruct, reinforce, and then extend basic mathematical concepts for students in grades two through nine. Beginning with trial and error, *Arith-Magic II* uses concrete examples in length, area, and volume to develop abstract concepts. Four levels of difficulty challenge individual ability. *Factoring Whole Numbers* is an interactive tutorial and activity package requiring students to give problems to the computer which then requires students to solve those problems. *Fractions* and *Decimals* are progressive programs requiring constant interaction with decision making, questions and answers, and concept demonstration.
Systems: Apple, TRS-80, C64, Pet
Address:
P. O. Box 12486
Portland, OR 97212
(503) 287-8137

Rand McNally Educational Publishing

For a company that made its name in cartography, it seems natural to chart a geographic course in educational software with four programs that explore the land and its relationship to society, history, and the elements. *Choice or Chance?* helps intermediate students understand the cause and effect of historical happenings as they relate to



geography with interactive lessons in exploration, colonization, expansion, and industrialization. *Time and Seasons* for grades seven to nine, demonstrates how time is measured and regulated, seasonal differences between hemispheres, and longitude and time lines. *Unlocking the Map Code* deciphers topograhic symbols, scales and color theory. Basic concepts, terminology, and the use of barometers, thermometers, and hydrometers are taught in *Weather or Not*, a meteorological study of world climatic conditions.
System: Apple II
Address:
8255 N. Central Park Ave.
Skokie, IL 60076
(312) 673-9100

Random House

Vivid color graphics and lifelike animation put the Peanuts characters to work in a series of family-based educational programs developed by one of the leading publishers of children's books. Special activities and color cards are designed to allow children ages 3 to 7 to share the learning experience with their parents in *Charlie Brown's ABC's*, which uses humorous situations to introduce the alphabet. The letters become building blocks in word families generated by *Snoopy's Reading Machine*, a program that rewards correct answers with an action sequence and advancement to the next skill level. Logic and coordination skills are developed as children ages 4 to 8 help the Peanuts gang find the way out of the *Maze Marathon*. This program draws new mazes each time with the puzzles gradually growing more difficult. The flying ace is back in Snoopy's *Skywriter Scrambler*, an action game for ages 8 to adult that tests wits and skill with word puzzles. When Woodstock is birdnapped, Snoopy the super sleuth involves children ages 8 and up in a mathematical game, *Snoopy to the Rescue*, that uses addition to accomplish the rescue.
System: Apple II, IBM PCjr, C64
Address:
201 East 50th St.
New York, NY 10022
(212) 872-8035

Scarborough Systems, Inc.

Blending educational elements with practical home applications and entertainment, The Scarborough System manufactures a range of instructional software for students and their families. Teens and adults are confronted by the economics and managerial challenges of building a successful manufacturing enterprise in Tom Snyder's *Make Millions,* which casts the user as a chief executive officer faced with problems of inventory control, research, productivity, pricing, competition, and advertising. Children ages 2 to 12 become the central character in the interactive *Build a Book* program that weaves friends, family, and pets into a personalized story that can be printed out and bound into a durable, professional quality, four-color book. Other programs include *Songwriter*, which comes with connector cables to couple the computer with a home stereo and reproduce the musical compositions of child or adult, and *MasterType's Figures + Formulas*, a weights and measures conversion program so complete it will convert hogsheads to liters and the speed of light to furlongs per fortnight.
System: IBM PC, Apple II, C64
Address:
25 N. Broadway
Tarrytown, NY 10591
(800) 882-8222

Ten Good Reasons To Buy Sams Two New Commodore Books.

Nobody covers Commodore® like Sams. That's because nobody knows technical publishing like Sams. We've been the leading technical publisher since 1946.

We're responsible for bringing you the best-selling COMMODORE 64 PROGRAMMER'S REFERENCE GUIDE. The first and only comprehensive guide to using the Commodore 64. And that's just the beginning.

We have Commodore books that teach you how to program in BASIC, use graphics and sounds, set up a trivia data base, and repair and troubleshoot. Ten books in all.

So it only stands to reason that you can turn to Sams for the books you need on Commodore's two new computers—the Commodore 16 and Plus/4.

Our just-released COMMODORE 16 USER'S MANUAL is for intermediate users who want to go beyond the basics with their Commodore 16. THE COMMODORE PLUS/4 BOOK is a beginner's guide to mastering the Plus/4 integrated spreadsheet, word processing, graphics and file management programs.

And like all our Commodore books, our new Commodore 16 and Plus/4 books make learning fast and easy!

If you own a Commodore, now you have a dozen good reasons to buy Sams books: COMMODORE 16 USER'S MANUAL, No. 22437, $12.95, THE COMMODORE PLUS/4 BOOK, No. 22389, $16.95, and our ten popular Commodore 64 books:

- COMMODORE 64 STARTER BOOK, No. 22293, $17.95
- LEARN BASIC PROGRAMMING IN 14 DAYS ON YOUR COMMODORE 64, No. 22279, $12.95
- COMMODORE 64 TROUBLESHOOTING AND REPAIR GUIDE, No. 22363, $18.95
- COMMODORE 64 PROGRAMMER'S REFERENCE GUIDE, No. 22056, $19.95
- TOOL KIT SERIES: COMMODORE 64 EDITION, No. 22314, $9.95
- COMMODORE 64 TRIVIA DATA BASE, No. 22396, $8.95
- COMMODORE 64 GRAPHICS AND SOUNDS, No. 22278, $8.95
- COMMODORE 64 BASIC PROGRAMS (2nd Edition), No. 22402, $9.95
- MOSTLY BASIC: APPLICATIONS FOR YOUR COMMODORE 64, Book 1, No. 22355, $12.95
- MOSTLY BASIC: APPLICATIONS FOR YOUR COMMODORE 64, Book 2, No. 22356, $14.95

Look for Sams Commodore books at your local bookstore or computer dealer. Or call Operator 102 at 317-298-5566 or **800-428-SAMS.**

SAMS™

HOWARD W. SAMS & CO., INC.
A Publishing Subsidiary of ITT
4300 West 62nd Street, P.O. Box 7092, Indianapolis, IN 46206

Offer good in USA only. Prices and availability subject to change without notice. In Canada, contact Copp Clark Pitman Ltd., 495 Wellington Street West, Toronto, Ontario M5V 1E9.

Commodore is a registered trademark of Commodore Business Machines, Inc.

CIRCLE 126 ON READER SERVICE CARD

Scholastic, Inc.

Using a combination of interactive techniques and simulated life experiences, the Scholastic Software series provides graphic and challenging learning opportunities in science, math, language arts, and computer literacy. Users can perform a simulated dissection of a frog, complete with scissors and other tools for cutting out the proper organs, animated sequences of organ functions such as the beating of the heart, and discussions of biology and anatomy, in *Operation: Frog*. Children ages 8 and up can write and illustrate their own stories with *Story Maker: A Fact & Fiction Tool Kit* that combines reading readiness and comprehension with the fundamentals of computer graphics, or uncover parts of *Mystery Sentences*, in a home and classroom program that sharpens verbal and analytical skills.

System: Apple II

Address:

730 Broadway
New York, NY 10003
(212) 505-3000

Sierra On-Line, Inc.

Mickey Mouse, Donald Duck, and Winnie-the-Pooh have been enlisted in Sierra's "child-friendly" software designed to provide a learning environment rich in entertaining and educational experiences. Designed for children ages 7 and up, *Winnie-the-Pooh in the Hundred-Acre Wood* develops mapping and reading skills as the child has to map a path through the woods to find several groups of lost objects. *Donald Duck's Playground*, for ages 7 to 11, promotes money-handling skills along with shape, color, and letter pattern recognition. America's favorite rodent takes the 8-year-old player in a journey through the solar system in *Mickey's Space Adventure*, developing problem-solving skills, logical thinking and mapping ability as the child pilots the spaceship among the planets in a search for fragments of a lost memory crystal.

System: IBM PC, PCjr, Apple II, C64

Address:

Sierra On-Line Building
Coarsegold, CA 93614
(209) 683-6858

Simon & Schuster

Not content with being a power in book publishing, or maybe because of that, Simon & Schuster has developed an educational software program that allows students to mix, heat, and combine chemicals on the screen. Putting young chemists, ages 9 to 13, in charge of a computerized chemical laboratory, *Chem Lab* comes equipped with two robot arms for handling chemicals and equipment, three Bunsen burners and separate dispensers for gases, liquids, and solids. If the computer survives all this, younger children, ages 4 and up, can wreak havoc with *The Great Gonzo in Wordrider* and *Kermit's Electronic Storymaker*. These Muppet Institute of Technology programs are designed to develop reading, writing, grammar, and vocabulary skills. The company also produces *Typing Tutor III* and *Lovejoy's Preparation for the SAT*.

System: IBM PC, Apple, C64

Address:

1230 Avenue of the Americas
New York, NY 10020
(212) 398-0820

SofTech Microsystems

SofTech has developed a number of products to meet classroom instruction requirements for UCSD Pascal and Fortran-77. *The UCSD Pascal Learning Environment* includes a completely integrated, student-friendly operating system, an editor that doubles as a sophisticated text processor, and screen formatting routines, graphics, sound and color capabilities. The compiler allows students to create programs of up to 2000 line of code using up to six units. *The UCSD Pascal Development Environment* provides instruction for beginning classes through advanced operating system architecture courses.

System: IBM PC, Apple, DEC Rainbow, Sperry, Mitsubishi

Address:

16875 W. Bernardo Dr.
San Diego, CA 92127
(619) 451-1230

Spinnaker Software

Fast-paced adventure games are the framework this company uses in its educational software offerings for ages 3 to adult. *Math Busters*, which concentrates on the four basic arithmetic processes, and *Counting Parade*, which uses a colorful parade of animals to identify numerals and number values, are new products in the Early Learning and Learning Discovery series. *Early Learning Skills*, for the 3 to 6 age range, is more ambitious with problems in pattern recognition; shape, color and size identification; routing and planning; part-whole relationships; and problem solving. Pre-teens and teens can share *Rock 'N' Rhythm* with their parents to develop a sense of rhythm, tempo, and melody while composing, recording, and playing original music.

System: IBM PC, Apple II, C64

Address:

215 First St.
Cambridge, MA 02142
(617) 868-4700

Springboard

Users can design, produce, and print out their own newspaper complete with banners, borders, headlines, and art with *The Newsroom*, a software program designed to stimulate creativity in journalists of all ages. With a modem, text and pictures can be transmitted between previously incompatible computers, including the IBM PC, Apple II, and Commodore 64. Suggested applications range from school and club newsletters to church bulletins and business announcements. *Mask Parade* is a creative design program that allows children ages 4 to 12 to design and then print out, color, and wear masks, hats, jewelry and badges. Enhancement of fine motor skills is the object of *Rainbow Painter* for ages 4 to 10, a program which teaches color coordination and creative drawing.

Systems: IBM PC, Apple II, C64, Atari

Address:

7807 Creekridge Circle
Minneapolis, MN 55435
(612) 944-3912

Sterling Swift Publishing Company

Math Worlds: Exploring Mathematics with Computers is a 14-week, classroom-based curriculum for grades six to nine using what the authors term a capture-student, student-learn approach. This begins with the use of a symbolic language, Easy Speak, which prepares students to use algebra to express numerical ideas and provides motivation to create input/output functions based upon the control the language gives the user over the computer. Students learn to use algebra as a tool in a world where things happen only if they can express themselves using an algebra-like language to tell the computer what to do. In addition, complex formulas are related to day-to-day activities and concepts of imagination or adventure.

System: IBM PC, Apple II, C64, Pet
Address:
7901 South I-35
Austin, TX 78744
(512) 282-6840

Sunburst Communications, Inc.

Buckling up for safety is not the only object of *Make It Click: Seatbelt Safety*, a preventive health and safety program addition to Sunburst's extensive line of software designed for use in school systems. The purpose of the program is to demonstrate to students the importance of careful decision making in life-threatening situations. Beginning with background information and statistics, players are confronted with a series of incremental choices leading to a final decision as to whether or not to wear seatbelts. *The Factory* is a problem solving program that uses color graphics and animation to develop inductive thinking in students grade four and up, integrating skills in visual discrimination, spatial perception, understanding sequence, logic, and efficiency.
System: IBM PC, Apple II, C64, Atari
Address:
39 Washington Ave.
Pleasant, NY 10570
(914) 769-5030
(800) 431-6616

Tandy

The student is an explorer on a journey of learning according to Tandy's philosophy. Educational programs include both fully developed software and authoring systems which allow teachers and curriculum designers to develop microcomputer-based lessons in any subject area. The *Author I* system is a screen-oriented process which provides for both text and graphic entries in exactly the format that the instructor wants for the particular course or material. No programming experience is required to use the menu-driven format, and there is a choice between non-interactive and interactive frames. For young students, two classroom packages have been developed by the Children's Television Workshop. *Hands On* is an introductory computer literacy course with two learning modules, Blackboard and Color It. Three language arts modules develop progressive linguistic abilities in *Play with Language*, a learning manager program that allows teachers to customize lessons, assign students to different levels of play, and to save a student's work on disk. *Super Logo* continues the student as explorer theme with multiple turtles, animation, and line-editing capabilities. *Solar Exploration* offers a scenic cruise through the solar system, providing data on the planets, moons, and interstellar discoveries. In addition, many MECC software products are marketed by Tandy.
System: TRS-80, Models I and III, and Color Computer
Address:
1400 One Tandy Center
Fort Worth, TX 76102-2805
(817) 390-3832

Telarium Corp.

Popular science fiction novels have been adapted into this series of interactive educational games that features state-of-the-art graphics, original music, mouse compatibility, and full-text menus. Incorporating an advanced text parser system, the games understand a vocabulary of several hundred common English words, and come with both a hint book and a word list. In Michael Crichton's *Amazon*, players become agents for a high-tech research firm in a search for lost emeralds in the Amazon. Ray Bradbury's *Fahrenheit 451* thrusts the player into a society whose government controls the populace by destroying all literature.
System: IBM PC, Apple II and Macintosh, C64
Address:
One Kendall Sq.
Cambridge, MA 02139
(617) 494-1200

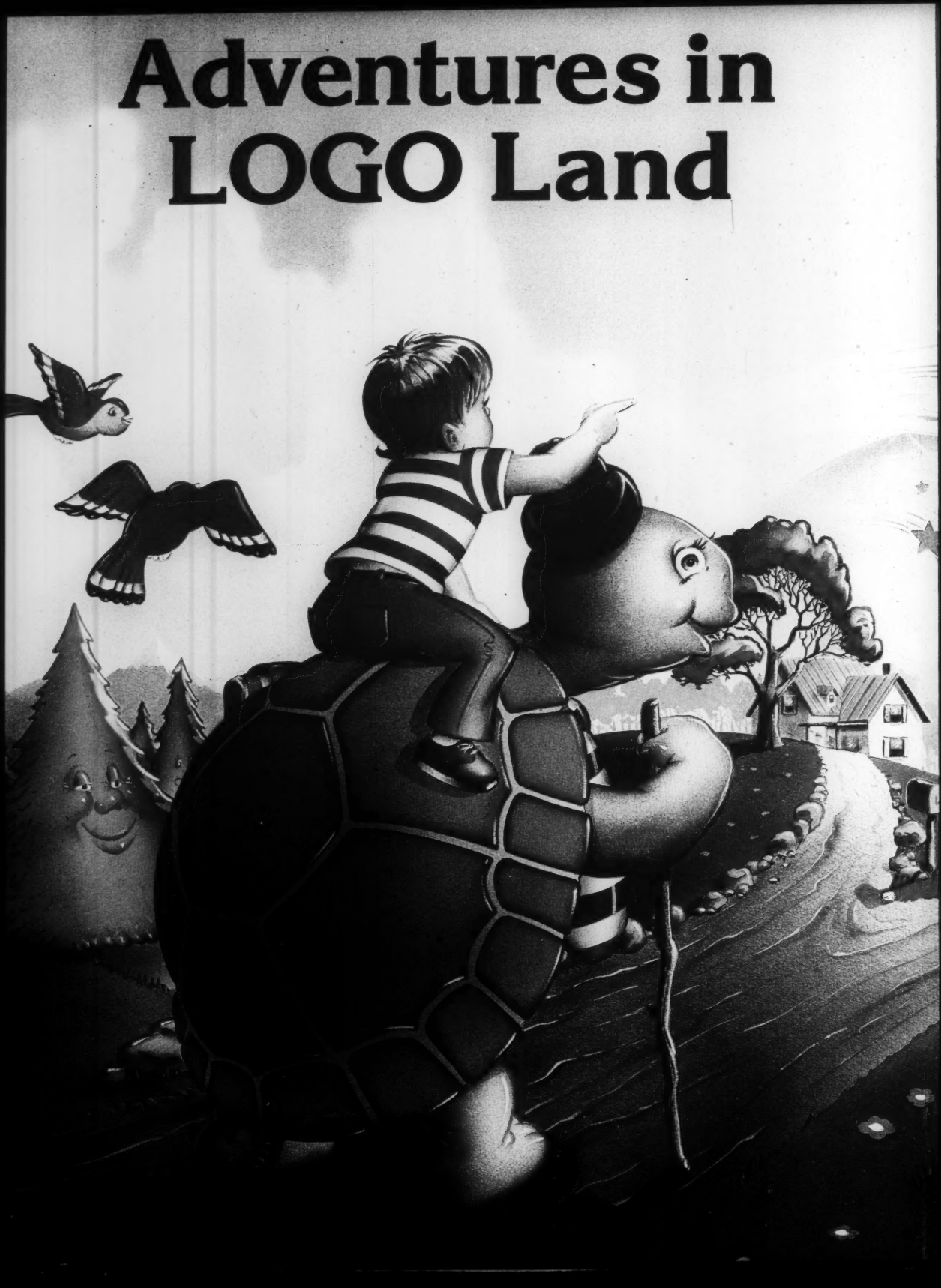
Weekly Reader Family Software

Family fun and education is the goal of this Xerox Education Publications division that is bearing the burden of educational software for children 3 to 6 years old with its Stickybear series. First appearing in *Stickybear Numbers* and *Stickybear ABC* software, the colorful, animated character was created by children's book author Richard Hefter and was designed to develop pre-school learning skills. The series was expanded with *Shapes* and *Opposites* which promote pattern recognition, reasoning skills, and understanding of basic concepts. For early grade school children, the bear introduces *Reading*, a word and sentence comprehension program with vocabulary building and instruction on subjects, objects, and verbs, and *Math*, a basic math teacher with 20 levels of difficulty that can be used simultaneously with as many as 25 children.
System: Apple II, C64
Address:
245 Long Hill Rd.
Middletown, CT 06457
(203) 347-7251

Windham Classics

Players take the role of the main character in well-known literary classics in this series of interactive adventures that teach creativity, common sense, and resourcefulness while building an appreciation of English literature. In Robert Louis Stevenson's *Treasure Island*, the player, alias Jim Hawkins, must outwit Long John Silver in the search for the gold. As Alice in Windham's adaptations of Lewis Carroll's *Alice in Wonderland* and *Through the Looking Glass*, the player encounters the March Hare, the Mad Hatter, the Queen of Hearts, the Chesire Cat, and other whimsical creatures in trying to escape Wonderland. Also published are *Below the Root*, based upon Zilpha Snyder's *Green Sky Trilogy*, and the *Swiss Family Robinson*.
System: IBM PC, Apple II, C64
Address:
One Kendall Sq.
Cambridge, MA 02139
(617) 494-1200 ■

Adventures in LOGO Land



Radio Shack's LOGO Software Leads Children Down the Path to a Wonderland of Learning

The thrill that comes with discovery and the excitement of a new experience are important tools you use in the classroom to encourage your students.

Now Radio Shack has a computer language that works the same way, to help introduce students to important concepts in mathematics, computer science and problem solving.

An Educational Tool for All Ages. Beginners and advanced students alike will enjoy working with LOGO, whether they are simply creating designs or using the list processing functions. And they can do their programming on their favorite Tandy computer. Super LOGO for the Color Computer is an expanded version of our popular Color LOGO. For the TRS-80 Model 4 and the Tandy 1000, 1200 and 2000 MS-DOS computers, we offer Dr. LOGO from Digital Research.

Super LOGO. This version offers list processing capabilities and decimal arithmetic in addition to "turtle" graphics which allow children to draw pictures. Unlike some versions of LOGO, Super LOGO lets children control several turtles simultaneously, so they can become familiar with multi-programming concepts. Super LOGO's "doodle" mode is an ideal learning tool for children too young to read.

Dr. LOGO. This version is for the MS-DOS Tandy computers and offers superb graphics to draw pictures or create intricate patterns. The program has a large workspace, complete program development environment, split-screen debugging, on-line help, precise math capability and, of course, list processing capabilities.

For more information on our LOGO programs, visit your nearest Radio Shack Computer Center, participating Radio Shack store or dealer. Or contact your Radio Shack Educational Coordinator.

For the name of your full-time Regional Educational Coordinator, call 800-433-5682, toll free. In Texas, call 800-772-8538.

Radio Shack®

The Name in Classroom Computing™

A DIVISION OF TANDY CORPORATION

CIRCLE 150 ON READER SERVICE CARD

For more information about Radio Shack's educational products and services, mail to:

Radio Shack, Dept. 85-A-651
300 One Tandy Center, Fort Worth, Texas 76102

Name _____

School _____

Address _____

City _____ State ____ Zip ____

Telephone _____

MS/TM Microsoft. Dr. LOGO/TM Digital Research.

WE COVER ALL SYSTEMS AND THEIR NEEDS.

Every month CREATIVE COMPUTING brings you the information you need to expand the functions of your system—any system—without any bias.

CREATIVE COMPUTING goes beyond machine specific magazines, providing you with a vital exchange of ideas and insights from all the world's leading computer manufacturers, as well as the technological innovators entering the marketplace.

Whether you're expanding your system with new hardware, software, or add-ons, you need all the information available—and we deliver just that!

If you're upgrading with memory boards, CREATIVE COMPUTING will help you choose the ones that meet your needs *and* budget!

When you're using word processors, we provide you with thorough reviews on software and new innovations—with hands-on tips you can apply!

And if you need more information on color monitors or printers, you can depend on CREATIVE COMPUTING for a complete comparison—for all systems!

No matter which computer you use — Apple, IBM, Atari, TRS-80, or any other system—we can tell you what's new and available for you to expand your system —any system!

Stay in the know and make the most out of your computer!
—Get* CREATIVE COMPUTING *with savings up to 50%!

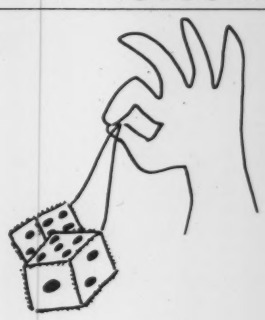
- 9 issues for only $9.97! SAVE 47%!
- 12 issues for only $12.97! SAVE 48%!
- 24 issues for only $24.97! SAVE 50%!

For faster service call toll free, 1-800-852-5200

CC4Z114

Math packages encourage fun, learning, and togetherness

Pre-schoolers Learn At Home



Penny Smith

There is an amazing array of arithmetic and counting programs available for pre-school and primary children. Some of the programs are extremely creative and interesting for both children and their parents. They deliver what they advertise in terms of educational goals and entertainment value. Other packages are not terribly enthralling. As a matter of fact, in many cases you could save yourself a lot of money if you just removed the furry dice from your rearview mirror and let your three-year-old count the spots.

In an effort to sort through some of the available program packages, we tested seven programs with pre-schoolers and young school-age children. Most of the programs were recommended for children in the four- to seven-year old range; two were recommended for eight- and nine-year olds. In evaluating these packages we tried to determine whether they actually accomplished their stated educational and entertainment goals. We evaluated their success in engaging and sustaining the children's interest. Finally, we looked for programs that could not only be used by the parent as a teaching tool but could also be enjoyed by the child alone.

The documentation in educational programs often includes a "Note to Parents." In the spirit of educational computing let me include the following note to adults who are looking for educational software for their young charges, relatives and otherwise. As we tested the programs, we found that the ability to deal with certain number concepts developed more slowly in some children than in others. We had to tread lightly to avoid frustrating those who were not yet able to grasp the concepts being stressed in individual games. Children's abilities also changed dramatically during the six months over which we tested the various programs. A child who was barely able to count to ten when we began using the programs is now easily able to do simple addition, subtraction, and even multiplication. Quite honestly, I can't say whether this dramatic leap forward was a result of his having worked with the programs or simply that he needed some extra time before he was ready.

The point is, don't force your child to sit in a corner and wear a dunce cap if he can't handle a particular program. If he cries when he sees Mommy boot up *ArithMagic,* just put it away and leave him alone for a while. Bring it out a few weeks or months later and see if he is ready for it. These packages are a joy to use when the child is enthusiastic about playing with them, but trying to force them on an unwilling subject doesn't prepare your child for anything but a nervous breakdown.

ArithMagic

These are three nifty little programs which can be used separately or in conjunction with one another to present a good range of basic number concepts for pre-school and primary children.

Counting

The first package, *Counting*, is geared to three- to six-year-olds and stresses counting and number recognition. The opening options screen lists two games and a stop sign which enables the child to exit the program. Game One, Introduction to Numbers, allows the child to type any number from 1 to 9. The computer will then display that number of animated objects on the screen. A question mark on the screen at the beginning of the game prompts the child to enter his choice of numbers. The proper amount of animated objects then appears on the screen. The objects then exit the screen one by one, allowing the child to count them as they go. The objects (ballerinas, balls, seals, horses) return with a large numeral to reinforce the association between the symbol and the number of objects.

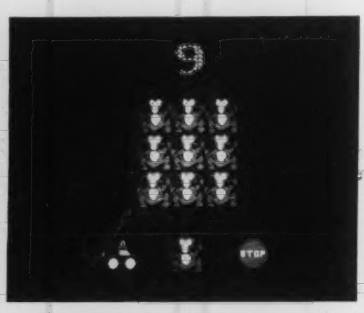
The second game in this package is the Counting Game. In this game the computer goes first. It presents the objects. The child must count them and enter the correct number. The computer allows three tries to select the correct answer, after which it helps the child count the objects.

The processes of counting and associating the appropriate number with a group of objects are essential component skills for the effective mastery of number, counting, and quantity concepts. This is a program that a child can use alone or with an adult. It is definitely geared to the non-reader. Even the option screen displays a symbol for each game along with the written title. This program, as is the case with so many pre-school packages, seems to be much more attractive to the child if an adult is there to encourage him and give help when it is needed.

The Counting Game is effective when used by the child alone as well. This is a nice option since children do make discoveries on their own when they have the time to experiment and explore both right and wrong answers. It's harder to do this with an adult looking over your shoulder and knowing which key you "ought" to push.

Addition

ArithMagic Addition is aimed at four- to seven-year-olds. It takes the concept of counting presented in the preceding program one step further to include simple addition problems. In the Addition Game, the computer displays two numbers for the child to add. Each num-



Software Profile

Name: ArithMagic (Counting, Addition, Subtraction)
Author: Roger Schank
Type: Educational
Recommended Age: 3 to 6 years (Counting)
4 to 7 years (Addition)
5 to 8 years (Subtraction)
System: Apple II (48K); IBM PC
Format: Disk
Summary: Graphic critters used to illustrate and review basic arithmetic concepts
Price: $39.95
Manufacturer: Compu-Teach, Inc.
240 Bradley St.
New Haven, CT 06511
(203) 777-7738
(800) 44-TEACH

ber is both shown as a numeral and represented by a group of objects. The child must count/add both groups of numbers and enter the correct answer. If the child is correct, the answer is shown, and the two groups of objects are combined to show the correct total sum. If the incorrect number is entered, the child is allowed to try again. After three tries, the computer shows the correct answer and helps the child count the objects.

The Option Screen lists a Modifying Parameters mode in which, logically enough, you can change the parameters of the addition game to stress a particular type of problem or numerical property according to your child's needs. This option expands the application of the package and allows selective reinforcement of addition facts. It also extends the life of the package and makes it useful for a broader age range.

ArithMagic Addition is another good one. It complements and expands on the concepts presented in the *Counting* package and has the same intriguing graphics, which hold the non-reader's attention. It is not a program strictly for babies, though, and should be valuable for children in Kindergarten and primary grades for review and extra help in gaining confidence in working with numbers. This is another program which has stood the test of time. It was pulled out of the cupboard for reruns long after the initial novelty had worn off.

Subtraction

ArithMagic Subtraction completes the set. It is aimed at children from five to eight years of age. Using the techniques mentioned in the first two programs, the subtraction package features a subtraction game in which the computer presents a simple subtraction problem and then illustrates it using a box which contains the number of objects in the minuend of the problem. When the child enters the correct answer to the problem, the number of objects in the subtrahend jumps out of the box to illustrate the principle of subtraction. In the problem 7 - 2, for example, two ducks jump out of the box leaving five. The correct answer appears at the top of the screen.

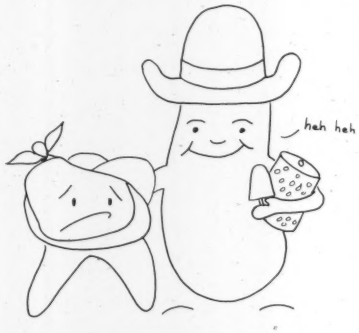
I found the subtraction program to be the least effective of the series. Illustrating the problem only after the child is able to figure out the answer seems a bit backward. There may be some great educational concept in force here, but I missed it. The young children who tested the program (pre-school and Kindergarten age) found it difficult to keep track of the balloons, ducks, and horses they were supposed to be deleting from the box. The older kids were bored with puppies and kitties and seemed to want a little more action.

Summary

Roger Schank's ArithMagic series does a very good job. It begins with basic number recognition and the concept of what it means to order objects and numbered groups and progresses to counting. Then, using the concept of counting as a foundation, it presents addition and subtraction. The series is very visual and concrete. Memorization of number facts progresses naturally through repetition. There is no sense of pressure or competition; all of the games move at a very calm, even pace.

Finally, all of these programs can be used and enjoyed by a child alone or with the help of an adult. There are no fancy tricks to make them work, and the documentation is very complete, explaining all of the ins and outs of running the games and modifying the various parameters so that even a novice parent can understand them.

CIRCLE **400** ON READER SERVICE CARD



The Sweet Shoppe

I have to admit to an immediate bias against a program which displays on the front of its package a chubby green jellybean clutching a bag of popcorn (probably candy-coated), an ice cream cone, a fudgesicle, and a jar of jellybeans to its bosom. However, I will try to lay aside my brown rice and brewer's yeast mentality and give this arithmetic learning package a fair evaluation.

Mr. Jellybean is directed by a joystick to select one of three learning games in the opening screen. We can choose to count jellybeans, subtract ice cream cones or add popcorn. Let's start with the jellybeans. Mr. Jellybean spills a jar of jellybeans, and the child must count what falls out. He must then maneuver Mr. J. under the piece of candy which contains the appropriate number. If the answer is correct, a happy face is drawn on the screen in jellybeans. If it is incorrect the jellybean does a flip

Software Profile

Name: The Sweet Shop
Type: Educational
Recommended Age: 4 to 7 years
System: Apple II; C64
Format: Disk
Summary: Mr. Jellybean teaches sugar-coated arithmetic concepts
Price: $29.95
Manufacturer: Eric Software Publishing
1713 Tulare
Fresno, CA 93721
(209) 237-0989

Software for the secret reason you own a personal computer. Fun.

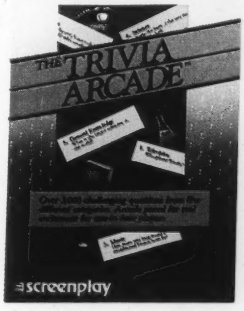
Sure you bought your computer for business or educational purposes. But all work and no play...

At Screenplay we design our programs to be as sophisticated as the spreadsheet you've been using. Superior graphics, game play and sound effects combine to make this serious business. Don't expect galaxian shoot 'em ups from Screenplay. Our programs are written to keep you stimulated for a long time to come.

How smart are you? Match wits with The Trivia Arcade.™

You'll find over 3,000 challenging questions from five separate subject categories. Play by yourself or compete with up to three more players. Pick your answer from a multiple choice display or input a complete response. If you choose, the computer will display the correct answers. The optional arcade feature adds greater challenge as you attempt to snare a whizzing category symbol before the timer runs out.

Available on diskette for Apple II™ series and Macintosh,™ Atari,™ Commodore 64™ IBM PC™ and PCjr™



Learn to play Blackjack from the experts. (And get a $125 certificate to test your skills at Caesars!)

Caesars Guide to Gaming™ is the first software series that just *might* increase your winnings. World famous Caesars casinos in Las Vegas, Tahoe, and Atlantic City tip their hands to help you become a smarter player. Hone your skills through Caesars strategy lessons and personalized drills. Sparkling graphics depict the Caesars casino of your choice. Play one-on-one or at a table with up to six friends or six assorted players "selected" by the computer.

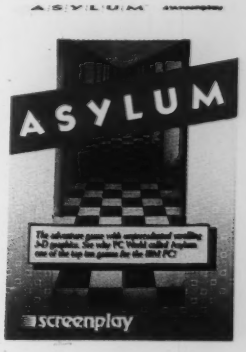
Coming soon: **Craps**, **Baccarat**, even **Slots**! Collect them all! Included with each **Caesars Guide** is a discount certificate worth up to $125 toward one night's lodging at any Caesars casino resort!

Available on diskette for Apple II series and Macintosh, Commodore 64 and IBM PC.

Last year over 20,000 Americans were committed to Asylum.

And you will be too once you enter our **Asylum**™ The scrolling three dimensional graphics make this adventure scenario a lot more involving than a text-only format. (It's like the difference between television and radio!) Escape **Asylum** by making full sentence commands. Direct your course through miles of corridors, hundreds of rooms. Converse with **Asylum's** denizens. You'll find some helpful, some harmful, and others only confounding. So involved is this **Asylum**, that you'll be committed from weeks to months. See for yourself why *PC World* last year named **Asylum** one of the top ten games for the IBM PC.

Available on diskette for Atari, Commodore 64, Macintosh and IBM PC.



See your local software dealer or call (800) 334-5470. In Canada call Beamscope—Canada (800) 268-5535.

screenplay™

1095 Airport Road, Minden, NV 89423

CIRCLE 178 ON READER SERVICE CARD

The Trivia Arcade, Asylum, Caesars Guide to Gaming, Atari, Apple II & Macintosh, Commodore 64, IBM PC and PCjr are trademarks of Screenplay, Caesars World, Atari, Inc., Apple Computer, Inc., Commodore Electronics, Ltd., and International Business Machines Corp. respectively.

©1985 Software Resource Group, Inc.

and encourages the child to try again.

The ice cream cone subtraction option displays three ice cream push carts, two of which contain numbers in a subtraction problem. The third cart is empty. The potential answers to the problem are displayed on fudgesicles at the top of the screen. The child directs Mr. Jellybean to the answer. If it is correct, he eats the ice cream. If it is wrong, he does a Good Humored flip and waits for further instructions. The ultimate reward for a correct answer is a great big gooey ice cream sundae. Popcorn addition operates on the same principle as the other two games.

The graphics are very well done, and Mr. Jellybean has some clever antics. Also, because the program is produced for younger children, the addition and subtraction problems are presented graphically, reinforcing the number concepts.

The package, unfortunately, is not self-correcting. If the child for some reason cannot or will not choose the correct answer, Mr. Jellybean continues doing flips until the child's next dental appointment. This can be a very sticky situation.

The documenation on this program is a little sketchy and not a little hard to find. It is cleverly concealed in a plastic pocket on the front of the box. There has to be a note inside the box which tells you where to find it. This minimal documenation is not a significant difficulty, though, because the games are simple enough for a very young child to figure out. They require no reading ability to operate well.

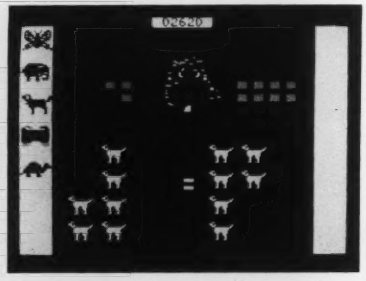
Note to parents: It might be a good idea to monitor the child's behavior while playing the game and be ready to wipe the saliva from his chin before it damages the keyboard.

CIRCLE **401** ON READER SERVICE CARD

Math Magic

If the ArithMagic series wins the parents' award for educational soundness, *Math Magic* wins the children's vote for "playability." *Math Magic* is essentially an arcade game with counting, addition, and subtraction practice thrown in for good measure.

The object of *Math Magic* is to defeat all the monsters by breaking down their walls before the child runs out of balls. The player scores points by bashing out individual bricks in the wall with a tennis ball. She can also score points by answering arithmetic problems which



Software Profile

Name: Math Magic
Type: Educational
Recommended Age: 4 to 9 years
System: Apple II; IBM PC
Format: Disk
Summary: Monster-filled arcade game that teaches addition and subtraction
Price: $39.99
Manufacturer: Methods and Solutions, Inc.
82 Montvale Ave.
Stoneham, MA 02180
(617) 438-5820

appear periodically when the monster pops up from behind the wall. The ball is kept in motion by means of a paddle at the bottom of the screen. If the player misses the ball with the paddle, the ball disappears and cannot be recovered. The game is over when the player runs out of balls. The player can receive either points or presents for her efforts. The game may be set for the age of the child; the younger child automatically receives presents and the older one receives points. The ball speed increases with each successive level of play, and the paddle size decreases.

In addition to allowing the adult to modify the game play generally by the child's age, the menu offers the opportunity to customize the game according to the individual's needs and abilities.

The game is infinitely easier to play with a joystick than with the keyboard since the paddle does not respond quickly enough to keyboard control.

One criticism I would mention is that there appears to be no provision for correcting entry mistakes in answering the math problems. Once a number is entered, I could not discover a way to clear it. Therefore, the child cannot check and correct his own mistakes before the computer buzzes and provides the right answers.

Another minor matter which would be alleviated by a note in the documentation is that when the child types in a two-digit number in answer to a problem, she must type the right most digit first (as you would when doing multi-column addition or subtraction). This is fine for the more complicated problems, but it is not the way younger children are accustomed to writing numbers. Since a mistake in entry cannot be corrected, this can be quite frustrating to a child who knows the answer but can't make it come up on the screen.

Math Magic is a fun game. The children enjoyed it enormously. It is particularly valuable in that it allows a broad range of skill levels. The ball speed and paddle size can be adjusted to fit the eye-hand coordination of the child. The graphics are well done, and you can choose to reward the child with pictures of nice little presents (sailboats, horses, kittens, etc.) or gruesome creatures.

Math Magic provides a nifty bit of practice in arithmetic or counting skills. Despite the elaborate customizing features, however, this game is not a strong teaching tool. The math/counting practice occurs in a very incidental way as part of the game. This is not necessarily a defect, but it is a point to be noted in your evaluation.

Math Magic is not a calm, gentle, let's-work-on-this-together game. It is a fast and competitive game that encourages the child to outwit the monsters. The kids love it, and I can recommend it as a supplement to other more laid-back learning games. If it is treated as a game and used in concert with other math supplements, it should be a winner from both the parent's and the child's point of view. ■

CIRCLE **402** ON READER SERVICE CARD

"Aw, all I got for my birthday was educational software."

COMPUTERBANC

BANC ON U$

GET SERIOUS. STOP PAYING HIGH PRICES NOW!

THOUSANDS OF AVAILABLE ITEMS. CALL FOR COMPLETE PRICING.

SYSTEMS

IBM PC
256K, Two 360KB Disk Drives, Color Graphics/Monochrome Graphics board, Parallel Printer Port, Monochrome Display (Amber/Green), DOS 2.1.
LIST PRICE $2950.00 — ONLY $2095.00
SUPER XT 10 Meg Upgrade $2795.00
IBM AT ..... 11% OFF

IBM SOFTWARE

LOTUS 1-2-3 ..... $289.00
LOTUS Symphony 425.00
MICROPRO Wordstar 249.00
ASCII Express For IBM 125.00
Wordstar Professional 359.00
Infostar 249.00
Multimate 269.00
MICROSOFT Word 229.00
Word W/Mouse 279.00
Multiplan 139.00
Project 159.00
ASHTON TATE Friday 179.00
dBASE II 280.00
dBASE III 349.00
Framework 359.00
LIFETREE SOFTWARE Volkswriter ... 119.00
Volkswriter Deluxe 169.00
FOX & GELLER Quickcode 139.00
dUtil 59.00
dGraph 149.00
MICRORIM Rbase: 4000 ..... 295.00
PFS Write 89.00
File 89.00
Report 89.00
Proof 79.00
Access 79.00
ENERGRAPHICS 269.00

IBM HARDWARE

AST Six Pack Plus 64K 259.00
MegaPlus II 259.00
PC Net 1 Starter Kit 830.00
QUADRAM Quadboard 0-K 219.00
Quadcolor 1 or Microfazer 64K 205.00
Quadlink 479.00
MICROSCIENCE
10MB Winchester 679.00
FRANKLIN TELECOM
10 Meg Harddisk 719.00
22 Meg Harddisk ..... CALL
Cartridge backup ..... CALL
HERCULES Mono Graphics 329.00
Color Card 199.00
ORCHID Turbo ..... CALL
PC Net Starter Kit ..... CALL
PLANTRONICS Colorplus 389.00
STB Rio plus 64K 249.00
Super Rio 259.00
Graphix +II NEW 309.00
AT Hardware ..... CALL
TEAC 55B 124.00
55F 180.00
TANDON TM 100-2 ..... 179.00
IBM Floppy 1.2 Meg ..... CALL
TALL GRASS 12MB W/Tape 2395.00
RAM 64K upgrade set 9 ..... 35.00
MOUSE SYSTEMS Optical Mouse ... 189.00
ALSO — XCOMP, PERSYST, ORCHID, TITAN AND OTHERS

PRINTERS

BROTHER HR-15 ..... 369.00
HR-25 ..... 619.00
HR-35 ..... 859.00
2024LQ 915.00
JUKI 6100 ..... 429.00
NEC 2030 ..... 659.00
2050 ..... 799.00
3530 ..... 1229.00
3550 ..... 1539.00
STAR MICRONICS Gemini 10X 259.00
Gemini 15X 389.00
EPSON RX-80 F/T 329.00
FX-80 ..... 349.00
FX-100 ..... 649.00
LQ1500 ..... 1299.00
OKIDATA 92A 389.00
93A 649.00
84A 949.00
PANASONIC 1091 ..... CALL
TOSHIBA 1350-P 1399.00

MONITORS

AMDEX 300 ..... 129.00
300A 145.00
310A 169.00
Color I+ 269.00
Color II 459.00
TAXAN Composite Amber 119.00
121/122 ..... 149.00
420 (RGB) 439.00
415 (RGB) 489.00
PRINCETON GRAPHICS HX-12 ..... 469.00
SR-12 ..... 625.00
MAX-12 ..... 189.00
ZENITH ZVM-122 Amber 95.00
ZVM-123 Green 95.00
NEC 1201 Hi Res Green 115.00
1205 Hi Res Amber 115.00
1206 Green 79.00
JC1215 Composite Color w/audio ... 215.00
JC1216 Color RGB 329.00

MODEMS

HAYES 1200 ..... 469.00
1200B 389.00
300 ..... 199.00
Micromodem //e 219.00
ANCHOR Mark X 109.00
Mark XII 249.00
Volksmodem 59.00
NOVATION Smart Cat Plus ..... CALL
Access 1-2-3 ..... 419.00
Apple Cat II 239.00
J-Cat 99.00
PROMETHEUS Promodem 1200 ..... 329.00

APPLE PRODUCTS

MICRO SCI A2 drives 179.00
RANA ELITE 1 ..... 219.00
TEAC drive 189.00
APPLE Compatible drive 169.00
WESPER Interface 69.00
BUFFERED 16K 139.00
SYSTEMS SAVER Fan 69.00
MICROSOFT Premium //e 279.00
Softcard CP/M 229.00
Multiplan 129.00
MAC Multiple (MacIntosh) 129.00
Basic (MacIntosh) 109.00
APRICORN Serial Card 69.00
Z-80 Card 59.00
ASCII Express Professional 89.00
DISKETTES S/S Box 10 ..... 12.00
D/S 19.00
KOALA Touch Tablet 79.00
HAYES Mach III JoyStick 39.00
THUNDERCLOCK 119.00
APPLEMOUSE II 129.00
VIDEX Ultraterm 179.00
80 COLUMN/64K Interface//e only ... 99.00
80 COLUMN Card II+ only 59.00

WE SUPPORT THESE FINE SYSTEMS:
Apple, Compaq, IBM, and many more.

TELEX #550757 / ANSWER BACK — COMPUTERBNK UD

VISA

Orders Only
800/332-BANC
OUTSIDE CALIFORNIA

COMPUTERBANC
16783 Beach Blvd., Huntington Beach, CA 92647
714/841-6160

Cash prices indicated. All products are in factory sealed packages. We guarantee all items for 30 days. Within this period, defective merchandise returns must be accompanied by RMA number. All other returns will be subject to a 10% restocking fee. For prepaid orders, there will be a 3% shopping charge, 5% for UPS Blue Label, $3.00 minimum. All orders outside U.S.A. at 15% shipping. California residents add 6% sales tax. Prices subject to change without notice.

© Copyright 1984 COMPUTERBANC. All Rights Reserved

CIRCLE 105 ON READER SERVICE CARD

BridgePro®

- Contract bridge with Goren bidding
- One and two player games
- Random hands — millions possible
- HELP features for beginners
- "Duplicate" Bridge option
- DEMONSTRATION and BEST HAND modes
- Fast machine language speed
- QUIT, AUTO FINISH, and REPLAY options

Ever wonder why millions around the world enjoy the card game of Bridge? Or why most newspapers have a daily Bridge column? Bridge is that kind of game: uniquely challenging and exciting. BridgePro™ makes it fun to learn and easy to improve Bridge skills. If you already know how to play, BridgePro™ lets you enjoy Bridge by yourself. And the cards are randomly dealt — you'll never have to repeat a hand. For many BridgePro™ will be a game that never grows old.

Disk $35. California residents add $2.28 tax. Visa/MC accepted.

Commodore 64 • APPLE II Family
ATARI Family • IBM PC/PC Jr.

Computer Management Corporation
2424 Exbourne Court, Walnut Creek, CA 94596 • (415) 930-8075
Ask for BridgePro™ at your favorite software specialty store

CIRCLE 109 ON READER SERVICE CARD

GOOD STUFF!

IBM PC & Compatables
IBM-PC Junior
Sanyo 550 - Tandy MSDOS
⇒GREAT PROGRAMS⇐
★SUPER LOW PRICES★
SUPER SAMPLER $5 PPD
SS1-SS12 DISKS $8.95 PPD

Looking for good low-cost programs for your PC computer, as well as good, solid information? You've found it!

Business, Financial, Games galore, Educational, Utilities and Graphics. They are all here! There are presently 12 disks and each has 7 to 12 programs. They are all listable and unprotected. Don't take our word for it! Send $5 for our Super Sampler diskette with 10 great programs, including a super loan amortization program, graphic blackjack, a full adventure and more! Full info on our other products and our information-packed newsletter will be included with your order!

SUPER MAILING LIST
14.95 Postpaid

Add, change, delete names, addresses and phone numbers with 8 category flags to select on. Prints lists or labels. Sort on zip or names. A random access tutorial in itself. **A SUPER VALUE!**

VISA MasterCard

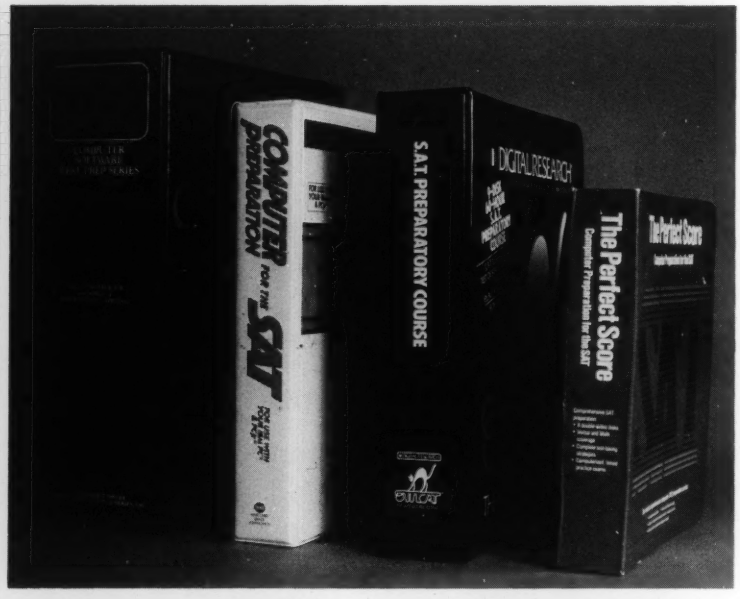
COMPUTER SOLUTIONS
P.O. BOX 354
*** MASON, MICHIGAN 48854**
(517) 628-2943
Phone Orders Welcome - Quick Service

CIRCLE 110 ON READER SERVICE CARD

In "Growing Up Literate" we look at the SAT (again).

SAT Packages—An Update

Betsy Staples



The Scholastic Aptitude Test: the great equalizer among college-oriented people throughout the USA. I remember taking it, and you probably remember taking it. But back when I took it—and maybe when you took it—common wisdom had it that you could not prepare for the SAT, so very few people bothered to try. Your parents probably bought you a book of sample questions, and you took one or two of the sample tests. But since everyone knew that the SAT was designed to measure the effectiveness of 11 or 12 years of education, you didn't waste much time with it. "A good night's sleep the night before" was held by teachers and guidance counselors to be the best preparation.

How times have changed. Students who take the test this year can trust tutors, cram courses, and computer software to bolster their confidence and improve their scores. And lest any doubt remain as to the efficacy of these aids, George Hopmeier, an educational consultant in Milton, FL, recently found a difference of 94 points on scores between students who used the Harcourt Brace Jovanovich SAT preparation program (the only program he tested) and those who had no supplementary preparation.

The manufacturers of the four packages we discuss here all have "big names"—Digital Research; Scott, Foresman; Harcourt Brace Jovanovich; and Barron's. But as we have seen before, a big name does not guarantee a worthwhile product; sometimes it just means that a worthless product makes a louder noise when it flops.

Space does not permit a detailed description of each package, so I will begin by describing the features that the packages have in common, mention salient characteristics of each, and then list and rank the products and their features in a chart, which I hope will answer any remaining questions.

Similarities

All of the packages have extensive manuals, which offer, in addition to basic instructions for loading the programs, sample questions, tutorial material, and strategies for taking the test. All of the manuals are professionally and attractively prepared.

All of the programs are easy to load and perform reliably throughout the evaluation period. We received one defective disk, which, after a frustrating call to Digital Research's technical support staff, was cheerfully and promptly replaced by Owlcat International, developers of the program.

Because the programs are unusually data-intensive, all of them spend a great deal of time accessing the disk. The worst offender on this count is the Barron's package which spins the disk for about eight seconds between questions and at least as long when switching among menus. This package has as many "please be patient" messages as some programs have variations on the "congratulations" theme. After an hour or so of watching your disk drive wear out, you begin to lose patience with even the "please be patient" messages.

The learning mode is another common feature. At the start of a section, or

after answering a question, you can choose to have the answers to the questions explained. Most of the explanations are clear and complete—especially if you have studied the tutorial information in the manual. The one situation in which this procedure breaks down is in the Test of Standard Written English when the answer tells you that a sentence is correct as presented. This is fine if you agree that the example contains no errors. If, however, you thought something was incorrect, there is no way to find out why you were wrong.

The alternative to learning mode is test mode, in which your answers are recorded and checked just as they would be on an actual exam. At the end of the test section, whether it be an entire simulated SAT or a short practice session, your score is calculated and rendered as an SAT equivalent. Barron's offers a detailed analysis of your score, listing the various skill areas (analogies—opposites, cause and effect, etc.) and the percent of each that you answered correctly. HBJ goes a step further, assigning a study priority to each topic.

None of the programs has what I consider to be an abundance of sample questions. A limited number of questions tests each skill area, so it is possible to memorize the correct answers. This could certainly be considered a drawback. On the other hand, if you subscribe to the theory that underlies the audiolingual method of foreign language teaching, you may believe that memorizing a correct sentence is tantamount to mastering the grammatical point it illustrates—and that could be considered a benefit.

Finally, all of the packages contain mistakes. The Worst Offender Award in this category goes to the Owlcat package for lines which repeatedly "intesect" in the geometry section and the non-word "prophesizing" in the verbal drill section. All of the packages included at least one verbal question, the answer to which I was unable to accept even after a trip to the dictionary.

Now, let's look at each package briefly to find out what distinguishes each from the others.

The Perfect Score

This somewhat pretentiously titled package from Mindscape, a division of Scott, Foresman, is the least expensive of the programs we tested. Written in MicroMotion Forth-79, it is also fairly efficient in terms of disk access. In learning mode, the explanation for the previous question remains on the screen while the next question is retrieved, so there is actually something worthwhile to look at while you are waiting, and you don't feel as though you are wasting time as you do with some of the other programs.

The *Perfect Score* manual concentrates on test taking strategies rather than sample questions. It discusses the types of questions you are likely to see on the test and suggests how to handle them. It also includes short vocabulary and math review sections, the text passages for the reading comprehension questions, and the figures for the math questions.

To select an answer, you move an arrow on the screen with the arrow keys on the keyboard. This makes it difficult to select an incorrect answer by mistake and almost forces you to read all of the choices—a good habit to get into.

This package falls short in the recordkeeping department. It asks for your name at the beginning of each session, but never uses it. Nor does it record your scores on the timed test or the practice sessions; once you press the spacebar to go on, your score is but a memory. Only the score of the timed test is converted to an SAT equivalent.

Owlcat

We tested the 60-hour *Owlcat SAT Preparatory Course* from Digital Research. An abridged 15-hour course, which Owlcat says offers the same documentation but fewer disks, is also available.

Unique features of the *Owlcat* package are Buddy Study and extensive on-screen tutorial material. Each disk offers

the option of Buddy Study, a game in which two players compete by answering SAT-type questions as quickly as possible. Before you play Buddy Study, you might want to choose Manual, an option that provides an on-screen tutorial on the material tested in the Lessons and Buddy Study sections of that disk. The Manual for the math disks includes appropriate on-screen graphics. When using the verbal disks, you have the additional option of asking for help from a dictionary before answering the question in learning mode.

The documentation of the *Owlcat* package is its strong point. I found it both helpful and attractive. The tutorial material is clear, concise, and complete; examples abound, and the explanations are among the best I have seen anywhere. From a purely aesthetic standpoint, I admired the large format loose-leaf pages printed on heavy glossy stock, and as an aelurophile, I found the illustrations of cats that decorate the pages amusing.

On the negative side, I always downgrade programs that do not allow the user to change an answer before entering it. *Owlcat* gives you only one chance to type the correct letter; if your finger slips off the E and hits the D, that's too bad, your answer is recorded as D. Even the College Board lets you change your answers—as long as you remember to bring along a good eraser. And then there are those careless typos (on the disk only)—what a shame that they detract from the quality of an otherwise fine package.

A final bit of bad news concerns the Diagnostic disk, which includes a sample test and analyzes your scores. This disk can be used only once. If you want to take the test again or administer it to more than one student, you must make backup copies and use a new one for each

test. Even worse news is that you find out about this feature by trying to take the test a second time and having the program tell you "Sorry, you have already taken this test." I was unable to find even a hint of it in the documentation. The good news is that you *can* make backup copies of this and all other disks in the package.

If the documentation of the 15-hour version is truly identical to the longer version I evaluated, the shorter version is probably a better buy.

Barron's Computer SAT Study Program

Barron's has been helping high school students prepare for the SAT for decades. In fact, the copyright dates on *How to Prepare for College Entrance Examinations* stretch all the way back to 1954 (it was probably the book your parents bought you). The problem is that Barron's transition to the computer age has not been a smooth one.

The package itself, a 7.5 lb. behemoth, weighs more than some computers

—a fact attributable to the voluminous documentation. Actually, documentation is not quite the right word to describe the books that come with the program. One of them is a small User's Manual that describes the program and provides instructions for use. That is "documentation." The remaining 1300+ pages comprise Barron's *Verbal Workbook, Math Workbook*, and *How to Prepare*. All three are replete with sample tests, explanations, and discussions of test taking strategy. They are worth every penny of the $20.85 it would cost to buy them *sans* software in your local bookstore.

"Where, then, does the software come in," you ask. And well you might ask; I certainly did. A bit of investigation reveals that in this case the software serves primarily as an electronic answer sheet. You read the questions from the books and type in A, B, C, D, E, or P (for pass). In Question (learning mode), the computer gives you a hint and a second chance if your first answer is wrong. A brief explanation follows, whether you made a correct choice or not.

In Test mode, your sophisticated high-tech hardware displays the numbers from 1 to 25. Again, you read the questions in the book and type in the letters that correspond to the correct answers. This time, as in a real test situation, there is no feedback at all. At the end of the test, your answers are displayed again with the correct answers alongside them. If you want an explanation of a given answer, you type its number, and the explanation appears. But it is up to you to spot the wrong answers.

At the end of each sample test, the computer calculates your score and prints or displays an analysis of your skills. It is your responsibility to transfer the analysis of your score to a chart in the back of the User's Manual.

The people at Barron's have mastered the art of writing books to help students prepare for the SAT. They missed the boat entirely when they tried to apply their years of mastery to a new medium. If you like the Barron's approach, buy the books and forget the software.

Computer Preparation for the SAT

Harcourt Brace Jovanovich is a veteran in a young industry; their *Computer Preparation for the SAT* has been on the market for three years. Like Barron's, the HBJ package relies heavily on a book that was apparently not intended to be used with a computer. The book, *How to Prepare for the SAT*, is a stand-alone course complete with practice tests, tutorial material, explanations, and test taking strategies.

Again, I found both the idea and the practice of answering questions from a book on an electronic answer sheet more than a little distressing. It just doesn't seem to take full advantage of the tech-

TIED TO AN 8-BIT CP/M COMPUTER AND SMALL SPREADSHEETS?

ADD CO-POWER TO GET MS-DOS AND UP TO 1024K OF MEMORY!

CO-POWER is an 8088 coprocessor for Z80, CP/M computers. CO-POWER-88 has up to 256K RAM and CO-POWER-Plus up to 1024K! Both install inside your computer's case and include MS-DOS 2.11 and RAMDISK.

Most MS-DOS and some PC-DOS programs run on your CO-POWER system. Make large databases and spreadsheets without losing your CP/M system. Kaypro 2X, 4/84 and 10s can even run LOTOS 1-2-3!

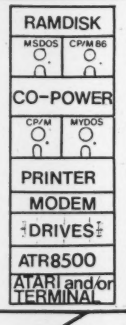
PLUS CO-POWER's RAMDISK feature turns its RAM into a high-speed CP/M drive.

For Kaypro, Osborne, Morrow, ATR, Xerox & Zorba computers. $400 — $986

ATR8500 . . . THE COMPUTER SYSTEM THAT LETS YOU CHOOSE YOUR COMPONENTS

SPECS

- Z80A CP/M computer that's also the complete ATARI interface
- 64k RAM
- Runs up to 4 5 ¼" drives 40T, 80T, SS & DS
- Serial and parallel ports for a printer and modem
- Uses a terminal or an ATARI plus tv/monitor for display
- Includes user-friendly CP/M 2.2
- Comes with a program to read 40+ CP/M formats
- Has a Z80 expansion bus
- Optional DMA controller
- Available as a kit (from $250) or fully A&T with optional built-in drives
- Hard disk coming soon



SWP MICROCOMPUTER PRODUCTS INC

For more information and orders, contact us at:
1000 W. Fuller
Fort Worth, TX 76115
817-924-7759

NEW ADDRESS!

CIRCLE 165 ON READER SERVICE CARD

nology, and balancing the book between various body parts and the minute amounts of empty space surrounding my computer was tedious. Several times I inadvertently skipped test questions and had to go back when I finally realized that my answers were not where they ought to have been. But, of course, that can happen on the SAT, too.

Based on your scores on the test, the computer will create for you a study plan, assigning high, medium, or low priority to the various topics for which drills are available. In the drills, you are told immediately whether your answer is right or wrong and asked whether or not you want an explanation. The math explanations are better than the verbal ones, some of which seem to stop just a bit short of providing all the information you need to understand the answer.

Responses in the drill section are almost instantaneous; there is no disk access between questions; while using *Computer Preparation*, I neither feared for the health of my disk drive nor wished I had learned to crochet in college.

HARCOURT BRACE JOVANOVICH
COMPUTER TEST PREPARATION SERIES
FOR USE WITH YOUR IBM PC & PCjr
COMPUTER PREPARATION FOR THE SAT
A COMPLETE PROGRAM FOR SCORING HIGH ON THE SCHOLASTIC APTITUDE TEST

The thing that struck me most forcefully about *Computer Preparation* was that its questions seemed significantly more difficult than the questions in other packages. Not having taken the SAT in many years, I cannot say which of the programs offers questions most similar to those on the test. I can say, however, that of the four reviewed here, the HBJ package offers the hardest and *Perfect Score*, the easiest questions.

Another unique feature of the HBJ package is the Vocabulary Flashcard disk, which offers 1000 items for drill and practice. A word appears on the screen and you are supposed to "look at the word and think of its definition." You then press the spacebar, and the definition appears below the word. Next, you press W or R to tell the computer whether your guess was right or wrong, so it can continue to quiz you on the ones you don't know. Again, not exactly optimum utilization of the available technology.

All things considered, HBJ seems to have eased into the computer age somewhat more smoothly than Barron's has, but the package is still a far cry from state-of-the-art. A spokeswoman for HBJ told me that an updated package, which will incorporate many of the advances in software design that have occurred during the past three years, is underway. I look forward to reviewing it for you. ■

Comparison of SAT Preparation Software

Name	The Perfect Score	Owlcat 60-hour SAT Preparatory Course	Owlcat 15-hour SAT Preparatory Course	Barron's Computer SAT Study Program	Computer Preparation for the SAT
System	Apple, IBM, C64	Apple, IBM	Apple, IBM	Apple, IBM, C64	Apple, Atari, IBM, C64 TRS-80 Models III and 4
Disks/Sides	6/12	9/9	4/4	3/6	2/4
Price	$69.95	$249.95	$89.95	$89.95	$79.95
Documentation					
Appearance	A	A	A	B	B
Tutorial Material	C	A	A	B	B
Test Taking Strategy	A	A	A	A	A
Mechanics	A	D	D	B	B
Program					
Speed	A-	C	C	F	A
Tutorial Material	A	A	A	C	B
Number of Questions	A	B	C	A	B
Recordkeeping	F	A	A	C	C
Errors	B	C	C	B	A
Overall Rating	B	B	B	C	B

The Perfect Score
Mindscope, Inc.
3444 Dundee Rd.
Northbrook, IL 60062
(312)480-7667
CIRCLE **403** ON READER SERVICE CARD

Owlcat 60-hour & 15-hour SAT Preparatory Course
Digital Research, Inc.
60 Garden Ct.
Pacific Grove, CA 93950
(408)649-3896
CIRCLE **404** ON READER SERVICE CARD

Barron's Computer SAT Study Program
Barron's Educational Series
113 Crossways Park Dr.
Woodbury, NY 11797
(516)921-8750
CIRCLE **405** ON READER SERVICE CARD

Computer Preparation for the SAT
Harcourt Brace Jovanovich
1250 Sixth Ave.
San Diego, CA 92101
(619)699-6335
CIRCLE **406** ON READER SERVICE CARD

Three more firsts from the people who invented the wheel.

XEROX

From day one, Xerox and Diablo have been known as the two best names in daisywheel printers. And now there are three more in the Xerox line to choose from.

The Xerox Advantage D-25 Diablo printer turns out letter quality documents quickly and quietly. And it does all that for the price of a dot matrix printer. At 80 c.p.s., the D-80IF is the fastest daisywheel printer ever made by Xerox. It has a built-in double bin sheet feeder. As well as the capacity to handle up to 16 computers at once.

And the D-36 spells reliability. It averages 4,000 hours of printing between maintenance calls.

But Xerox didn't stop there. Each of these new machines is compatible with most computers on the market, including the IBM-PC. And they're all easy to use.

They're also a part of Team Xerox, so they can be serviced by the national Xerox service force and authorized service locations across the country.

So if you're looking for the latest in daisywheel printing technology, go with the people who've been in the business the longest. Call 1-800-833-2323, ext. 25, your local Xerox office, an authorized Diablo or Xerox dealer or send your business card to Xerox Corporation, Dept. 25051, P.O. Box 24; Rochester, NY 14692.

FOR MORE INFORMATION FROM XEROX CIRCLE 163 ON READER SERVICE CARD

XEROX®, Diablo® and the identifying numbers herein are trademarks of XEROX CORPORATION.
IBM® is a registered trademark of International Business Machines Corporation.

Computer Discount Products

Monthly Mail-Order Listing
For Apple & IBM Users

Retail Showrooms In California:
San Jose • San Mateo • San Francisco

SINCE 1977

WE PAY SHIPPING*
Get The Details Below!!

PRINTERS & MONITORS $CALL

PRINCETON HX-12	459.99
Max-12 Amber	179.99
TAXAN 12" Amb-IBM	169.99
420 RGB Color	399.99

KENSINGTON

System Saver-Ap	65.00
PC Saver-IBM	29.99

HARDWARE

Ap	ALS Z-Engine (Former Z-Card)	134.99
Ap	CDP 16K Ram Card	39.99
Ap	Parallel Interface w/Cable	39.99
Ap	DAN PRYMAR Lower Case 1	25.99
Ap	Lower Case 2, Rev 7	19.99
Ap	EXTENDED 80 Col. Card-IIe	129.99
Ap	JOYSTICK Kraft or TG	39.99
Ap	MICRO-SCI A-2 Drive	199.99
Ap	ORANGE MICRO Grappler +	114.99
Ap	Buffered Grappler	179.99
Ap	THUNDERCLOCK	109.99
Ap	TITAN Accelerator IIe	259.99
Ap	Neptune 64K	199.99
IBM	AST Six Pack Plus 64K	279.99
IBM	QUADRAM 512 + 64K	229.99
IBM	Microfazer 8K-All Config.	149.99
IBM	Quadboard I or II-No K	219.99
IBM	TEAC ½ Height Drive #55B	159.99

EDUCATIONAL

DLM

Ap	Alien Addition/Minus Mission	ea22.99
Ap	Alligator Mix	22.99
Ap	Division/Multiplication	ea22.99
Ap	Dragon Mix	22.99
Ap	Spelling Wiz/Verb Viper	ea31.99
Ap	Word Invasion/Word Radar	ea31.99

LEARNING COMPANY

Ap	Bumble Games/Plot	ea27.99
Ap	Gertrudes Puzzle/Secret	ea29.99
Ap	Rockys Boot/Robot Odyssey	ea34.99
Ap/IBM	Addition Magician	23.99
Ap/IBM	Magic Spell/Number Stump.	ea27.99
Ap/IBM	Moptown Hotel/Parade	ea27.99
Ap/IBM	Reader Rabbit	27.99
Ap/IBM	Word Spinner	24.99

PEACHTREE

Ap	Algebra I-IV	ea29.99
Ap	Algebra V & VI	ea34.99

SPINNAKER

Ap	Grandmas House	24.99
Ap	Kids On Keys	19.99
Ap	Kidwriter	24.99
Ap	Rhymes & Riddles	19.99
Ap	Sum Ducks	24.99
Ap	Trains	27.99
Ap/IBM	Alphabet Zoo	19.99
Ap/IBM	Delta Drawing	34.99
Ap/IBM	Facemaker/Fraction Fever	ea24.99
Ap/IBM	Diddle Diddle/Kindercomp	ea19.99
Ap/IBM	Presidents Choice	27.99
Ap/IBM	Snooper Troops I or II	ea31.99
Ap/IBM	Story Machine	24.99

COLLEGE BOUND – Apple

BARONS SAT	59.99
CBS Mastering SAT	149.99
PEACHTREE SAT	37.99
PEACHTREE PSAT	37.99

UTILITIES & ENHANCEMENTS

Ap	BEAGLE D/Code – *NEW!*	$CALL	IBM	FONTRIX	99.99
Ap	Beagle Graphics	44.99	IBM	NORTON UTILITIES	55.99
Ap	Dos Boss	17.99	IBM	SIDEKICK	41.99
Ap	Fat Cat	26.99	Ap/IBM	TURBO PASCAL	41.99
Ap	GPLE	32.99			
Ap	Triple Dump	31.99		*VIDEX-Apple*	
Ap	BRODERBUND Dazzle Draw	44.99		ENHANCER II	99.99
Ap	Graphics Library	19.99		FUNCTION STRIP	31.99
Ap	Print Shop	39.99		HARDSWITCH	14.99
Ap	EASTSIDE Wildcard II	111.99		PSIO	169.99
Ap	FONTRIX	59.99		SOFTSWITCH	25.99
Ap	FINGERPRINT For Epson	44.99		ULTRATERM	244.99
Ap	MERLIN	44.99		VIDEOTERM w/Softsw.	219.99
Ap	MOCKINGBOARD	89.99			

ENTERTAINMENT

Ap	BEAGLE I.O. Silver – *NEW!*	$CALL
Ap	DECATHLON	23.99
Ap	MASTERTYPE	31.99
Ap	SIR TECH Knight of Diamond	27.99
Ap	Legacy of Llylgamyn	31.99
Ap	Wizardry	37.99
Ap	Wizziprint	19.99
Ap	WIZPLUS	23.99
IBM	GATO	29.99
IBM	MASTERTYPE	34.99
IBM	SIR TECH Wizardry	44.99
Ap/IBM	CHAMP. LODERUNNER	24.99
Ap/IBM	ELECTRONIC ARTS Archon	31.99
Ap/IBM	Music Set/Pinball Set	ea31.99
Ap/IBM	One On One/Sky Fox	ea31.99
Ap/IBM	Seven Cities of Gold	31.99
Ap/IBM	FLIGHT SIMULATOR	37.99
Ap/IBM	NIGHT MISSION PINBALL	32.99
Ap/IBM	SARGON III	34.99
Ap/IBM	SIERRA ON LINE Frogger	24.99
Ap/IBM	ULTIMA II or III	39.99
Ap/IBM	TRILLIUM Amazon/Rama	ea29.99
Ap/IBM	Fahrenheit 451/Shadow	ea29.99
Ap/IBM	WINDHAM Below The Root	18.99
Ap/IBM	Swiss Family Robinson	18.99

INFOCOM

CUTTHROATS/ENCHANTER	ea27.99
DEADLINE/SUSPECT	ea34.99
INFIDEL/SORCERER	ea31.99
PLANETFALL/SEASTALKER	ea27.99
WITNESS/ZORK I	ea27.99
ZORK II/ZORK III	ea31.99
HITCHHIKERS GUIDE	27.99

KOALA TOUCH PAD

Ap-PCjr	IBM
85.99	95.99

MUPPET KEYS – 59.99

Copy II+ / Copy II PC / Copy II MAC 25.99 ea.

APPLE PRE-BOOTS

Apple Writer	14.99
Apple Writer for Ultraterm	23.99
Visicalc	39.99
Visicalc w/Memory	66.99
Visicalc for Ultraterm	54.99

MAXELL 5¼ SS 10/100	19.99/189.
MEMOREX 3½ SS 10/100	41.99/399.
MEMOREX 5¼ SS 10/100	18.99/179.
FLIP-FILE Holds 50-5¼	14.99
MEDIA MATE Holds 30-3½	11.99

APPLICATION – Home & Business

Ap	ASCII Express	99.99	IBM	CROSSTALK	139.99
Ap	CONTINENTAL Hm. Acct.	44.99	IBM	LOTUS 1-2-3	299.99
Ap	Home Accountant MAC	75.99	IBM	MICROPRO Telmerge	119.99
Ap	Tax Advantage	39.99	IBM	MONOGRAM Dollars & Sense	109.99
Ap	MONOGRAM Dollars & Sense	79.99	IBM	PFS Rept, File, Graph, Write	ea99.99
Ap	PFS Rept, File, Graph, Write	ea84.99	Ap/IBM	MICRO COOKBOOK	31.99
IBM	ASCII Express Pro	139.99	Ap/IBM	MICROSOFT MULTIPLAN	169.99
IBM	ASHTON-TATE dBase II	299.99			
IBM	dBase III	449.99			
IBM	Framework	399.99			
IBM	CONTINENTAL FCM	71.99			
IBM	Home Accountant	84.99			
IBM	Tax Advantage	49.99			

MODEMS

HAYES 300 Baud	209.99
1200B for IBM	409.99
Micromodem IIe	239.99
NOVATION Applecat II 300 Bd.	249.99
Expansion Module	29.99
J Cat	109.99

WORD PROCESSING

Ap	BANK STREET Write/Spell	ea44.99
Ap	MICROPRO Wordstar	279.99
Ap	Wordstar Pro w/CP-M	349.99
Ap	SENSIBLE SPELLER	89.99
Ap	SIERRA Screenwriter II	89.99
IBM	BANK STREET Writer	59.99
IBM	LIFETREE Volkswriter Deluxe	199.99
IBM	MICROSOFT Word w/Mouse	299.99
IBM	MICROPRO Wordstar 2000	259.99
IBM	Wordstar 2000 Plus	359.99

*ALL SOFTWARE SHIPPED FREIGHT-FREE
U.S. Mail – $10 Minimum Chg.
Hardware Shipping – $CALL

CIRCLE 106 ON READER SERVICE CARD

Computer Discount Products

860 So. Winchester Bl., San Jose, CA 95128
(408) 985-0400 FROM 8AM PST

NO CHARGE FOR CREDIT CARDS • GUARANTEED FAIR PRICING
Purchase Order Prices Differ – Call First • Prices Subject To Change • Software Sales Final

ORDER # C4

Please allow time for personal checks to clear.

A valuable computer aid to choosing a college—
for Apple, IBM, and TRS-80 computers

College Explorer

David H. Ahl

Every year hundreds of thousands of high school seniors make a decision that will affect the rest of their lives: What college shall I go to? This decision is influenced by many objective and subjective factors: guidebooks, campus visits, opinions of family and friends, location, curriculum offered, and scores of others. Unfortunately, most students do not have the patience to wade through the descriptions of the nearly 3000 colleges in the U.S. to determine which ones best meet their requirements. Nor do guidance counselors who may have 100 or more students to advise.

Enter the computer. In 1973, the Educational Testing Service devised a program, SIGI, for students to use in selecting a college or career. It ran on a fairly large PDP-11 configuration; thus relatively few systems were installed, mostly in large school districts and at community colleges.

Today, however, with the increasing capacity of microcomputers, it is possible to put a college selection package such as *The College Explorer* into a much smaller machine. The program and database are still quite sizable; the Apple version, for example, requires a 64K machine.

The Apple package includes five disks. Disk 1 (the main program) is protected, and a backup is provided. Disks 2, 3, and 4 (data and utilities) can be copied. The program output is keyed to college descriptions in the 1800-page College Handbook, which is included with the package. Two copies of a 20-page student manual are included along with two student worksheets (schools will want to copy the worksheets). There is also a 7-page counselor manual, a sheet of technical specifications, and a warranty card (which must be returned to get annual updated editions of the databases at the reduced price of $119).

The College Explorer allows a user to develop a personal college preference profile made up of the features most important to him. The profile can be reviewed and modified until it accurately reflects his interests. The computer will then search through a list of colleges and universities to find those that match the profile.

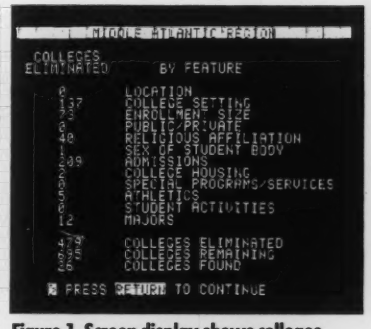


Figure 1. Screen display shows colleges eliminated by each of 12 selection factors.

Software Profile

Name: College Explorer
Type: College selection package
System: 64K Apple II, IBM PC, TRS-80 Model III and 4
Format: Disk
Summary: An excellent aid in choosing a college
Price: $189
Manufacturer: The College Board
888 Seventh Ave.
New York, NY 10106
(212) 582-6210

When Disk 1 is loaded it asks the user's name, sex, and the date. Then a menu is presented which allows him to go to a tutorial instruction session, build a profile, review or modify the profile, reload a previous profile, or end the session. Using the program is simplicity itself. There are only two active keys: spacebar to move to various menu items and Return to choose an item.

The College Explorer uses 12 factors that high school students frequently cite as important in selecting a college:

- Degree level (Bachelor or Associate)
- Curriculum categories (the back of the student manual lists over 400 categories and majors)
- Location (by region or state)
- College setting (from rural to large city)
- Private/Public/Religious
- Male, female, or coed
- Enrollment size
- Admissions policy (admits less than half of all applicants, more than half, or all high school graduates)
- College housing available
- Special programs (accelerated study, honors program, employment service, handicapped facilities, and many others)
- Athletics (intercollegiate or intramural for specified sports)
- Student activities (10 choices)

If the user has no preference for a particular factor, it can be skipped. Also, the instructions note that choosing just one option under certain factors, say enrollment size, can be very limiting; in those cases a range is recommended such as the option one prefers plus one smaller or larger.

After all the options have been entered, the program directs the user to insert a data disk. The package includes data on 1755 colleges offering associate's degrees and 1659 offering bachelor's degrees. The search is then initiated and, at the end of each region, a summary appears showing the number of colleges eliminated by each factor and the total number of colleges meeting all of one's criteria (see Figure 1).

At the end of the search, several options are presented: modify the profile, print (or display) the colleges found, save the profile on disk, or start over (for the next user).

CALL FOR MORE SOFTWARE VALUES AND OUR NEW FREE CATALOG, TOO!!

FOR THE IBM...	
Business	
D. Base III	$420.00
Multimate	300.00
Word Perfect	280.00
Lotus 1, 2, 3	315.00
Multiplan	130.00
Microsoft Word with Mouse	225.00 285.00
R. Base 4000	330.00
T. K. Solver	210.00
Knowledge Man	330.00
Framework	420.00
Friday I	190.00
PFS: File	88.00
PFS: Graph	88.00
PFS: Report	78.00
PFS: Write	88.00
Desk Organizer	195.00
Harvard Proj. Mgr.	250.00
Systems/Utilities	
Sideways	$ 38.00
Fontrix	79.00
Fontpak 1-9	12.00
Crosstalk 16	130.00
Fortran Compiler	239.00
Copy P.C.	25.00
Side Kick	33.00
Norton Utilities	48.00
Graphix Partner	90.00
Hardware	
Koala Pad	$100.00
Mouse	145.00
Sm. Modem/2WB	410.00
8K Mem. Chips	ea. 4.00
Quad Boards	CALL!
AST Boards	CALL!
Masterpiece	90.00
Mach III Joystick	35.00
Recreation	
Flight Sim.	$ 30.00
Lode Runner	25.00
Wizardry	40.00
One On One	36.00
Millionaire	40.00
Pinball Construct.	30.00
Music Construct.	30.00
Kings Quest	35.00
Hitch Hiker Guide	28.00
Suspect	28.00
Cut Throats	28.00
Zork I	28.00
Enchanter	28.00
Sargon III	35.00
Standing Stones	30.00
Miner 2049er	29.00
Ultima III	40.00
Zaxxon	32.00
Star Trek	32.00
Quest	25.00
Transylvania	25.00
Back Gammon	35.00

FOR THE APPLE...	
Business	
PFS: Write	$ 78.00
PFS: File	78.00
PFS: Graph	78.00
PFS: Report	78.00
Think Tank	105.00
Sensible Speller	79.00
Multiplan	81.00
Dollars & Sense	69.00
Home Acct.	47.00
Utilities	
Fontrix	$ 45.00
Font Pack 1-9	12.00
Copy II +	22.00
Ess. Data Dup.	45.00
Print Shop	34.00
Print Shop Lib I	19.00
Print Shop Refills	9.00
G.P.L.E.	33.00
Beagle Graphics	35.00
Triple Dump	25.00
D Code	20.00
Sideways	38.00
Apple Mechanic	20.00
Hardware/Misc.	
Mockingboard	$ 80.00
System Saver	60.00
Microsoft A-2	200.00
Koala Pad	80.00
Grappler +	115.00
Muppet Key Pad	50.00
Mach III Joysticks	35.00
Flip File 70	15.00
80 Col. 64K IIe	100.00
Education	
Typing Tutor III	$ 35.00
Master Type	28.00
Early Games	21.00
Barron S.A.T.	63.00
Word Attack	35.00
Robot Odyssey 1	35.00
Reader Rabbit	24.00
Story Tree	28.00
Word Invasion	28.00
Game Show	28.00
Sticky Bear ABC	28.00
Recreation	
Cut Throats	$ 26.00
Hitch Hiker Guide	26.00
Suspect	26.00
Enchanter	26.00
Zork I	26.00
Seven Cities of Gold	30.00
Flight Simulator II	34.00
Beyond Castle Wolf	24.00
One on One	30.00
Imperium Galact.	26.00
Summer Games	26.00
Champ. Lode Runner	25.00
Quest	25.00
Transylvania	25.00
Music Const.	30.00
Kings Quest	35.00

Personal Checks take 2 wks. to clear & MasterCard add 3% for handling. Send $2.00 ★ exp. date, ★ & signature. ★ Ohio residents add 5.5% tax. ★ Shipping: $1.00 • $3.00 for shipping. Ohio res. 5.5% sales tax. We accept purchase orders from qualified organizations. Prices subject to change without notice.

FAS-TRACK
COMPUTER PRODUCTS
5360 N. High Street
Columbus, OH 43214
(614) 436-1124
OR TOLL-FREE OUTSIDE OHIO
1-800-272-1600

CIRCLE 122 ON READER SERVICE CARD


```
COLLEGE EXPLORER (TM)
COPYRIGHT (C) 1984 BY COLLEGE ENTRANCE
EXAMINATION BOARD

      NAME: DETTA AHL
      DATE: 11/23/84

** BACHELOR'S DEGREE CURRICULUM **
     BUSINESS & COMMERCE, GENERAL
     BUSINESS MANAGEMENT &
       ADMINISTRATION
     MARKETING & PURCHASING
     INTERNATIONAL BUSINESS
     PERSONNEL MANAGEMENT
     CIVIL, CONSTRUCTION &
       TRANSPORTATION ENGINEERING
     ENGINEERING, GENERAL
     ARCHITECTURAL ENGINEERING
     GEOLOGICAL ENGINEERING
     INDUSTRIAL & MANAGEMENT
       ENGINEERING
     'ANY' OR 'ALL' CHOICE: ANY

** COLLEGE LOCATION **
     CONNECTICUT
     MAINE
     MASSACHUSETTS
     NEW HAMPSHIRE
     RHODE ISLAND
     VERMONT
     DELAWARE
     DISTRICT OF COLUMBIA
     MARYLAND
     NEW JERSEY
     NEW YORK
     PENNSYLVANIA
     ILLINOIS
     MICHIGAN
     MINNESOTA
     OHIO
     WISCONSIN

** COLLEGE SETTING **
     SMALL CITY--50,000-249,999
     LARGE TOWN--10,000-49,999
     SMALL TOWN--2,500-9,999
     RURAL--LESS THAN 2,500

** PUBLIC/PRIVATE **
     (NO OPTIONS CHOSEN)

** RELIGIOUS AFFILIATION **
     PROTESTANT
     NO RELIGIOUS AFFILIATION

** SEX OF STUDENT BODY **
     (NO OPTIONS CHOSEN)

** ENROLLMENT SIZE **
     2000-4999 UNDERGRADUATES
     5000-7500 UNDERGRADUATES
     MORE THAN 7500 UNDERGRADUATES

** ADMISSIONS **
     LESS THAN HALF OF ALL APPLICANTS
       ADMITTED

** COLLEGE HOUSING **
     COLLEGE HOUSING OFFERED

** SPECIAL PROGRAMS/SERVICES **
     (NO OPTIONS CHOSEN)

** ATHLETICS **
     SWIMMING, INTERCOLLEGIATE W

** STUDENT ACTIVITIES **
     THEATRE

   THIS ENDS YOUR COLLEGE PROFILE


COLLEGES THAT MATCH YOUR PROFILE

     CT YALE U   (P.250)
     MA HARVARD & RADCLIFFE C   (P.685)
     MA MASS INST OF TECHNOLOGY
        (P.692)
     MA SALEM S C   (P.706)
     MA TUFTS U   (P.714)
     MA U OF LOWELL   (P.715)
     NH DARTMOUTH C   (P.915)
     NH KEENE S C   (P.918)
     RI BROWN U   (P.1449)
     MD UNITED STATES NAVAL ACAD
        (P.649)
     NJ PRINCETON U   (P.953)
     NJ TRENTON S C   (P.970)
     NY CORNELL U   (P.1021)
     NY SU OF NY AT BINGHAMTON
        (P.1095)
     NY SU OF NY C AT GENESCO   (P.1101)
     NY SU OF NY C AT NEW PALTZ
        (P.1102)
     NY UNION C   (P.1118)
     NY UNITED STATES MILITARY ACAD
        (P.1119)
     PA BUCKNELL U   (P.1344)
     PA LAFAYETTE C   (P.1381)
     PA WIDENER U   (P.1431)
```

Figure 2. Portion of output from a run of the program.

A Broadening Experience

We found it very easy to use the program; the tutorial at the beginning was scarcely necessary. The 20-page student manual is easy to understand. Like the tutorial, it is practically unnecessary except for the list of curriculum categories and majors in the Appendix.

The instruction manual states that a good goal is 20 to 30 colleges to be examined in more detail. With no prompting other than that provided by the program, one college-bound junior ran the program and came up with a list of 21 possible schools. She then changed a few factors and added some states, and the program produced 28 possibilities.

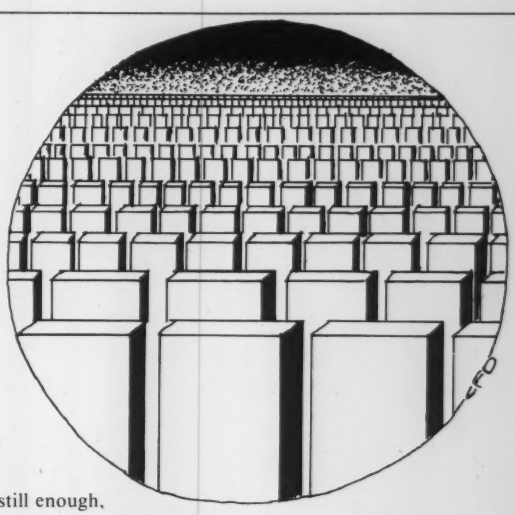
The other students who tried the program also produced workable lists and, as a whole, felt they learned a great deal by using the program. One thought the program was in error because a particular college didn't appear on his list; however, he learned to his surprise that one of his chosen options was not a feature of that college, and it was removed during the search.

In all, we felt the package was easy to learn, easy to use, and well designed to produce workable results for most users. Students enjoyed using the program, and, most important, felt the results broadened their horizons in selecting a college with a curriculum that would mesh with their interests. ■

CIRCLE **407** ON READER SERVICE CARD

Subatomic Tombstones

Peter Payack



Some elementary particles have a lifetime
of less than one-septillionth of a second.
If you could peer through a powerful enough
microscope you would see
an endless graveyard of infinite rows
of infinitesimal tombstones
floating about the rolling gravity waves
of microscopic space.

Each tombstone would be capped with
a + or – or 0
in accordance with its electrical beliefs.

Peter Payack, 64 Highland Avenue, Cambridge, MA 02139.

If you are still enough,
as you peer through the microscope,
you can hear the chilling cosmic wind
as it howls through this subatomic cemetery.

A typical epitaph reads:
Rho Prime Meson
Born Dec. 8, 1980, 12:00
Died Dec. 8, 1980, 12:00 + .00000000000000000000000001 second.
"Not even a twinkle in somebody's eye" ■

Professional Handicapping Systems by Professor Jones

GLD. Thoroughbred "Gold" Edition™
A "Full" featured thoroughbred analysis designed for the professional and serious novice. **$159.95** complete

EGLD. Enhanced "Gold" Edition™
"Gold" Edition with complete Master Bettor™ system integrated onto the same disk. This powerful program will transfer all horses and scores to the bet analysis with a "single keystroke." (Master Bettor™ included) **$199.95** complete

GLTD. Limited "Gold"™
Enables **Professional Handicappers** to assign specific values to the racing variables "they" feel are important. Create program weight based on a particular track and fine tune it for **maximum** win percentage. This program is designed for "ease of use". The user needs **no programming experience.**
(contains Integrated Bettor™) **$299.95** complete

GD. Gold Dog Analysis™
The only professional dog handicapper on the market, includes:
1) Speed 4) Post Last 7) Running Style
2) Post Today 5) Distance 8) Weight
3) Kennel 6) Condition 9) All new internal weighting
10) NEW class indicator
If you are near a greyhound track, you can't afford not to use this program.
$149.95 complete (with integrated Master Bettor™) **$199.95**
Limited Dog™ $299.95

PPX. Professor Jones' Football Predictor, Prof. Pix™
Complete Football Analysis with **Data-Base.**
1) Overlays 3) "Super Plays" 5) Data Base Stats
2) Point Spreads 4) "Over/Under" bets 6) Holds "100" teams
Highest percentage of winners 1984
$49.95 complete **$99.95** with Data Base Management

MHH. Master Harness Handicapper™
Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada.
$159.95 complete with integrated Master Bettor™ **$199.95**

NBA. Basketball™
This data base managed analysis will provide the user with "ALL" betting situations while storing relevant information on the disk.
$79.95 complete with Manual

LOT. Lottery Analysis™
Statistical comparison program designed to detect subtle patterns in winning lottery numbers.
$49.95 complete with Manual

BROCHURE AVAILABLE

IBM™
APPLE™
TRS-80™
CPM™
COMMODORE™

Prof. Jones
1114 N. 24th St.
Boise, ID 83702

VISA MasterCard

48 HR. FREE SHIPPING

CALL 208-342-6939

TERMS: FREE SHIPPING ALL SOFTWARE. Add $6.00 UPS Blue/C.O.D. Add $6.00/Add 3 weeks personal checks/ Add 4.5% ID residents/Add $6.00 outside U.S.A./ Prices subject to change

CIRCLE 143 ON READER SERVICE CARD

EMERGENCY POWER SYSTEMS
Full Back-Up Computer Protection!

as low as $399

Completely self-contained with 28 ampere hour enclosed gel cel battery. Transfer time to emergency power 10 milliseconds. Two units: 425-Watt and 200-Watt can operate up to 35 minutes *allowing ample time for comfortable, safe shutdown!* 425-Watt unit sounds audible alarm. Both systems indicate when operation is line power or battery. Built-in 3-way AC line filter prevents transient spikes and surges. Four receptacles. Automatic regulated battery charger. Output voltage 117 volts, AC 60 cycle, frequency controlled ± 1/2 cycle.

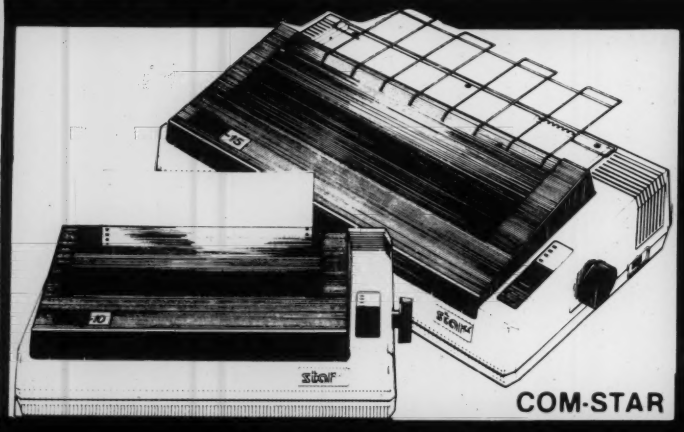
☐ **200-Watt Power System ONLY $399**
☐ **425-Watt Power System ONLY $539**

Call toll free to order...1-800-662-5021
IN ILLINOIS, CALL 1-312-642-6871 OR MAIL TO
INDUS-TOOL, 325 W. Huron, Dept. CC, Chicago, IL 60610

Enclosed is $_____ or charge on
☐ MasterCard or ☐ Visa *Expires*_____
*Card No.*_____
Name_____
Company_____
Address_____
City, State, Zip_____
Phone_____

CIRCLE 128 ON READER SERVICE CARD

FANTASTIC COMPUTER PRINTER SALE!!!



COM-STAR T/F

Tractor
Friction
Printer

only $ 169**

- Lowest Priced, Best Quality, Tractor-Friction Printers in the U.S.A.
- Fast 80-120-160 Characters Per Second • 40, 46, 66, 80, 96, 132 Characters Per Line Spacing
- Word Processing • Print Labels, Letters, Graphs and Tables • List Your Programs
- Print Out Data from Modem Services • "The Most Important Accessory for Your Computer"

** DELUXE COMSTAR T/F 80 CPS Printer $169.00

This COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interface).

Premium Quality 120-140 CPS 10X COM-STAR PLUS+ Printer $199

The COM-STAR PLUS+ gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120-140 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, true lower decenders with super & subscripts, prints standard, italic, block graphics & special characters. It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX80). RATED "BEST BUY" BY CONSUMERS DIGEST BUYERS GUIDE, JANUARY 1985! List $499.00. **Sale $199.00.**

Premium Quality 120-140 CPS 15½X COM-STAR PLUS+ Business Printer $319.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER plus 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100). List $599. **Sale $319.00.**

Superior Quality 15½" COM-STAR PLUS+ H.S. High Speed 160-180 CPS Business Printer $449.00

15½" Carriage and more powerful electronic components to handle larger ledger business forms! (Serial Centronics Parallel Interface). List $799. **Sale $449.**

12" DAISY WHEEL PRINTER $249.00

"JUKI" Superb letter quality daisy wheel printer, 12" extra large carriage, up to 12CPS bi-directional printing, drop-in cassette ribbon, (90 day warranty) centronics parallel or RS232 serial port built in! (Specify). List $399.00. **Sale $249.00.**

Superior Quality 10" COM-STAR+ H.S. HIGH SPEED 160-180 CPS Business Printer $349.00

This **Super High Speed Com-Star+ Business Printer** has all the features of the 10" COM-STAR+ PRINTER with HIGH SPEED BUSINESS PRINTING 160-180 CPS, 100% duty cycle, 8K Buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs. **A RED HOT BUSINESS PRINTER** at an unbelievable low price (Serial or Centronics Parallel Interface). List $699.00.
Sale $349.00.

Printer/Typewriter Combination $299.00

"JUKI" Superb letter quality, daisy wheel printer/typewriter combination. Two machines in one — just a flick of the switch. 12" extra large carriage, typewriter keyboard, automatic margin control and relocate key drop in cassette ribbon! (90 day warranty) centronics parallel or RS232 serial port built in (Specify). List $499.00. **Sale $299.00.**

• 15 Day Free Trial - 1 Year Immediate Replacement Warranty

PARALLEL INTERFACES

For VIC-20 and COM-64 — $49.00. Commodore B-128 — $139.00. Apple — $79.00. Atari — $79.00.

Add $14.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $29.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!
VISA - MASTER CARD - We Ship C.O.D. to U.S. Addresses Only

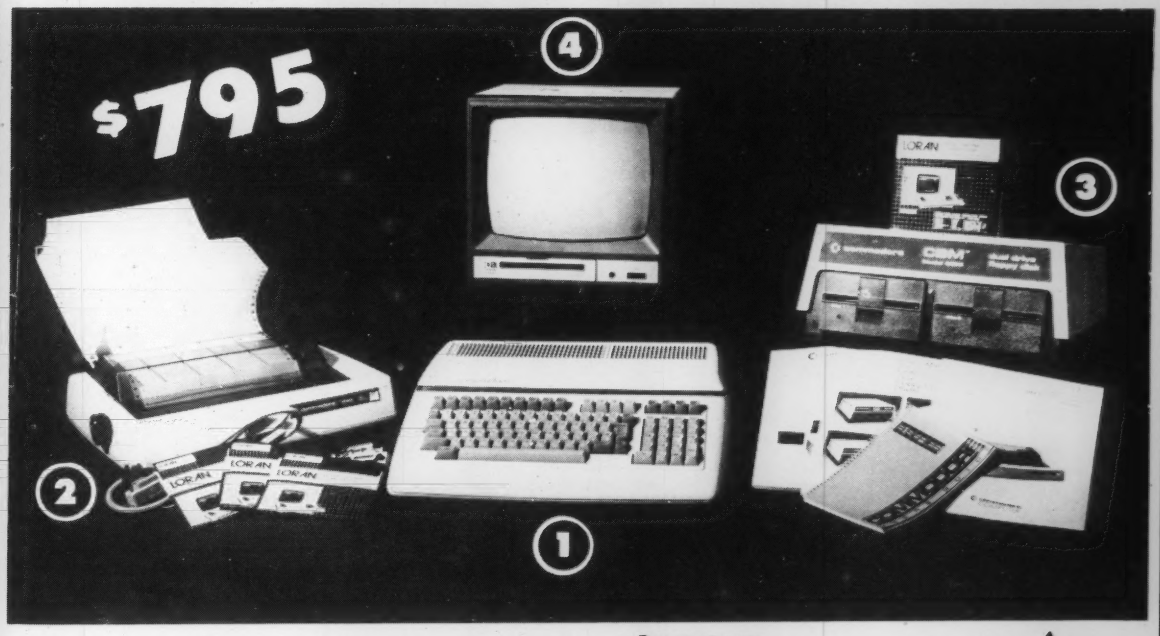
PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COM-STAR PLUS+ Print Example: ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

NEW 128K —MEGA BYTE DUAL DISK DRIVE—80 COLUMN

COMPUTER SYSTEM SALE!

HOME • BUSINESS • WORD PROCESSING



LOOK AT ALL YOU GET FOR ONLY **$795.**

	LIST PRICE
① B128 COMMODORE 128K 80 COLUMN COMPUTER	$ 995.00
② 4023 - 100 CPS - 80 COLUMN BIDIRECTIONAL PRINTER	499.00
③ 8050 DUAL DISK DRIVE (over 1 million bytes)	1795.00
④ 12" HI RESOLUTION 80 COLUMN MONITOR	249.00
• BOX OF 10 LORAN LIFETIME GUARANTEED DISKS	49.95
• 1100 SHEETS FANFOLD PAPER	19.95
• ALL CABLES NEEDED FOR INTERFACING	102.05
TOTAL LIST PRICE	**$3717.95**

$795 SALE PRICE

PLUS YOU CAN ORDER THESE BUSINESS PROGRAMS AT SALE PRICES

Programmers Reference Guide
List $29.95
Sale $24.95

	LIST	SALE	*SYSTEM PRICE**
Professional 80 Column Word Processor	$149.95	**$99.00**	***$49.00***
Professional Data Base	$149.95	**$99.00**	***$49.00***
Accounts Receivable	$149.95	**$99.00**	
Accounts Payable	$149.95	**$99.00**	
Payroll	$149.95	**$99.00**	
Inventory	$149.95	**$99.00**	
General Ledger	$149.95	**$99.00**	
Financial Spread Sheet	$149.95	**$99.00**	
Order Entry	$149.95	**$99.00**	

* When Bought with B128 Computer System.

☆ PRINTER REPLACEMENT OPTIONS

(replace the 4023 with the following printers at these sale prices. Interface Included)

	LIST	SALE
☆ Olympia Executive Letter Quality Printer	$699.00	**$369.00**
☆ Comstar Hi-Speed 160 CPS 15½" Business Printer	$779.00	**$459.00**
Telecommunications Deluxe Modem Package	$199.00	**$139.00**
IEEE to Centronics Parallel Printer Interface	$179.00	**$139.00**

15 DAY FREE TRIAL. We give you 15 days to try out this SUPER SYSTEM PACKAGE!! If it doesn't meet your expectations, just send it back to us prepaid and we will refund your purchase price!!
90 DAY IMMEDIATE REPLACEMENT WARRANTY. If any of the SUPER SYSTEM PACKAGE equipment or programs fail due to faulty workmanship or material we will replace it IMMEDIATELY with no service charge!!

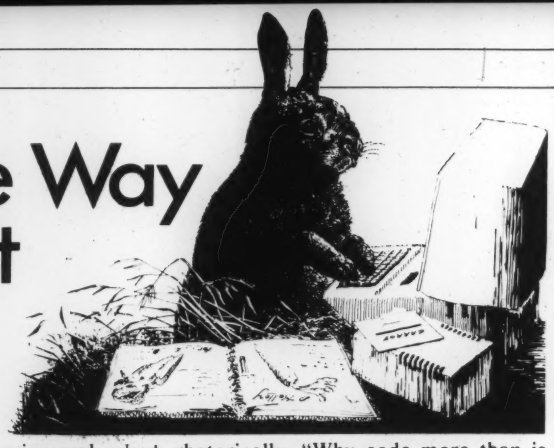
Add $50.00 for shipping and handling!!
WE DO NOT SHIP THIS SYSTEM TO FOREIGN COUNTRIES, CANADA, PUERTO RICA, ALASKA, OR HAWAII.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail! We accept Visa and MasterCard. We ship C.O.D. to continental U.S. addresses only.

PROTECTO ENTERPRIZES WE LOVE OUR CUSTOMERS!
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

CIRCLE 145 ON READER SERVICE CARD

The Fibonacci sequence revisited

More Than One Way To Skin a Rabbit



David H. Ahl

Many moons ago, we printed a letter from Konrad Kossman with a longish program for producing the Fibonacci sequence. In his letter he asked if there was a better way. I offered two alternatives, admittedly written in some haste. Readers replied with a vengeance pointing out several additional ways to generate this famous sequence. But before listing some of these gems, let us put the problem in a somewhat better historical perspective.

Leonardo Fibonacci was an Italian mathematician who lived in the late 12th and early 13th centuries. In *Liber abaci* (1202), for centuries a standard work on arithmetic and algebra, he advocated the adoption of Arabic notation. In *Practica geometriae* (1220) he organized and extended the material then known in geometry and trigonometry.

In *Liber abaci*, Fibonacci proposes an interesting problem of *the rabbits*. Suppose we put a pair of adult breeding rabbits in a cage to produce offspring and that after two months and each month thereafter they produce another pair, which, in turn, breed after two months. (This is hypothetical, of course, as rabbits do not reach maturity before four months of age.) If all the rabbits survive, how many pairs will there be at the end of any given month, or the end of one year?

The solution to the problem can be easily diagrammed—at least for the first six months or so. If you draw a rabbit diagram, you will find the number of pairs of rabbits in successive months is 1, 1, 2, 3, 5, 8, 13, 21...

Fibonacci did not explore the question of sequences more deeply, and it was not until the 19th century that Francois Edouard Anatole Lucas investigated the Fibonacci series and formally stated that each term is the sum of the two before. Thus, it invites computation by means of a computer program.

In the original article, my little three-line program to generate the series was as follows:

```
10 X=1:Y=1:PRINT 1;1;
20 Z=X+Y:PRINT Z;
30 X=Y:Y=Z:GOTO 20
```

Several readers pointed out that it is unnecessary to print out the first two elements of the series. Martin Mersky of Phoenixville, PA showed that the program could be easily amended to generate the entire sequence.

```
10 X=1
20 Z=X+Y:PRINT Z;
30 X=Y:Y=Z:GOTO 20
```

A further modification which Martin feels illustrates what is actually going on, and is also simple and elegant is as follows:

```
10 X=1
20 Y=X:X=Z
30 Z=X+Y:PRINT Z;:GOTO 20
```

Ramunas Motekaitis of College Station, TX commented that my program disturbed his sixth sense of efficient programming and asked, rhetorically, "Why code more than is absolutely necessary?" Here is his program:

```
10 Y=1
20 PRINT Y;:Z=X+Y
30 X=Y:Y=Z:GOTO 20
```

Mikko Nieminen of Finland took a somewhat different approach which calculates two new terms in each loop. Not surprisingly, all five of these programs run at exactly the same speed.

```
10 X=1:Y=1
20 PRINT X;Y;
30 X=X+Y:Y=X+Y:GOTO 20
```

All of the above approaches to calculating the Fibonacci sequence use recursion and must calculate every number in the sequence to reach a given point. However, George Miller of San Francisco and Joseph Freedman of Willow Grove, PA both mentioned a wonderful formula from linear algebra that produces any given number in the series.

$$F_n = (1/\sqrt{5}\,)\,[((1+\sqrt{5}\,)/2)^n - ((1-\sqrt{5}\,)/2)^n]$$

This formula is discussed in detail in Donald E. Knuth's book, *The Art of Computer Programming, Vol. 1* (pp. 78-83). Simply stated, the closed form of a function is different from the iterative and the recursive forms in that you furnish a number, n, and the formula calculates the value for that number.

You can easily write a program with the above formula to calculate Fibonacci numbers, but it will not work! The reason is that the computer uses an approximation to calculate the value of the square root of 5. Here are two programs that use this formula to calculate any Fibonacci number, the first by George Miller and the second by Joseph Freedman. Notice the corrections for the roundoff errors.

```
10 FOR N=1 TO 20
20 PRINT INT((.5+SQR(5)*.5)^N/SQR(5)+.5);
30 NEXT N
```

```
10 FOR N=1 TO 20
20 PRINT INT((((1+SQR(5))/2)^N-
   ((1-SQR(5))/2)^N)/SQR(5)+.5);
30 NEXT N
```

To generate an entire sequence of numbers, the formula method is considerably slower than the recursive approach; however, to generate just one number, particularly a high order one, the formula is certainly preferred. Miller's program, incidentally, is somewhat faster than Freedman's.

To Mr. Fibonacci go our thanks for his rabbit problem; and to our readers, thanks for helping skin it in a variety of interesting ways! ■

Wondrous Numbers And Other Diversions

W. Lloyd Milligan

Tortoise: *Let me. . . show you a property which is very easy to define, and yet for which no terminating test is known. I'm not saying there won't ever be one discovered, mind you—just that none is known. You begin with a number—would you care to pick one?*

Just a few pages before the *end* of Douglas Hofstadter's marvelous book, *Gödel, Escher, Bach: An Eternal Braid,* the Tortoise tells Achilles about "wondrous" numbers.

Begin with any whole number. If it is odd, multiply it by 3 and add 1. If it is even, divide it by 2. Continue in the same way with the resulting number. If applying this process repeatedly eventually brings you to 1, then the number you started with is a wondrous number.

The curious thing about the wondrous property is that you can never be sure (by applying this algorithm) that a number is *not* wondrous.

The Tortoise leaves Achilles a puzzle:

Tortoise: *Why don't you try starting with 27? Mind you, I don't promise anything. But sometime, just try it, for your amusement. And I'd advise you to bring along a rather large sheet of paper.*

Perhaps one sort of "rather large sheet of paper" is the personal computer. And who having such a sheet of paper in hand could resist the Tortoise's challenge?

You first need a number, so

10 INPUT N

If it is odd, multiply it by 3 and add 1.

20 IF N/2 < > INT(N/2) THEN N=N*3+1

If it is even, divide it by 2.

30 IF N/2 = INT(N/2) THEN N=N/2

If you have reached 1, then stop and declare the number to be wondrous.

40 IF N=1 THEN STOP

If not, repeat the entire process.

50 GOTO 20

This five-step program works as intended; however, the reader is cautioned that on some trips through the loop the value of n changes twice!

It would be interesting to count how many iterations of the wondrous process are required to make a number wondrous, and, in particular, to make 27 wondrous. To this end we sharpen and decorate our program a bit (see Listing 1). You will want to verify this for yourself, but when I asked my program whether 27 was wondrous, it told me that 27 is a *won-won-wondrous* number.

Primes and Polynomials

Martin Gardner offers the following problem. Starting with the prime number 41, add 2 to get another prime 43. Then add 4 to get 47. 47 + 6 is 53 and 53 + 8 is 61. So far there have been nothing but primes. Does this procedure always yield primes?

To answer this question, we procure a rather large sheet of paper, and proceed to write a small program (see Listing 2). We may be satisfied on the first run to examine 10,000 terms of the sequence, or else be prepared to wait a while.

As it happens we won't have to wait long. Because the forty-first term in the sequence turns out to be composite. But!—wasn't 41 the number we started with? Is this some kind of coincidence?

Actually not. Let's look at another way of characterizing the sequence. The kth term is given by

(1) $k^2 + k + 41$

This is easy to see, if you recall that the sum of the first k positive integers is $k \cdot (k+1)/2$. The first k even numbers

$$\left(\sum_{i=1}^{k} 2 \cdot i\right)$$

Listing 1. Program to test if a number has the wondrous property.

```
10 PRINT "WONDROUS NUMBER TESTER"
20 INPUT "ENTER NUMBER TO BE TESTED";N
30 M=N
40 I=0
50 IF M<>1 THEN 80
60 PRINT I;" ITERATIONS ARE NEEDED TO
   MAKE";N;"WONDROUS."
70 GOTO 20
80 IF M/2=INT (M/2) THEN 110
90 I=I+1
100 M=M*3+1
110 I=I+1
120 M=M/2
130 GOTO 50
140 END
```

is twice the sum of the first k positive numbers ($2\sum_{i=1}^{k} i$).

Clearly, if we set k = 41, expression (1) factors as 41•(41+1+1).

Indeed for any prime p,

(2) $k^2 + k + p$

is divisible by p whenever k = p. This result is trivial, but it points in the direction of a less trivial one. You might imagine that some sufficiently complex polynomial

(3) $a_0+a_1k+a_2k^2+...+a_nk^n$

is a formula for prime numbers. That this cannot be so was first shown by the Swiss mathematician Leonhard Euler (1707-1783). See note [1].

The *sufficiently assiduous* reader (Hofstadter's term) has probably noticed that the key to the method of Listing 2 is that $k^2 + k + c$ differs from $(k-1)^2 + (k-1) + c$ by exactly 2•k. There is a more general method of evaluating polynomials which is of interest. Expression (3) can be re-written as follows:

(4) $k•(...k•(k•(a_n•k + a_{n-1}) + a_{n-2}) + ... + a_1) + a_0$

I first learned of this method of evaluating polynomials from the Hewlett-Packard HP-55 mathematics program handbook. This numerical method works especially well with H-P's stack-oriented "reverse Polish notation" pocket calculators, but is useful in a variety of applications.

A fairly easy programming exercise is to write a routine for evaluating a polynomial, given an ordered n + 1 tuple of coefficients and some fixed value x as input. Such a routine can be used, for example, to compute the sum of the first n k*th* powers using commonly available formulas.

Counting Things

The first mathematical thing that most of us learn to do is count. This is as far as many people ever get. For this reason, mathematicians have set aside a special branch of their field called "combinatorial analysis." Ironically some of the most difficult mathematical problems involve counting—it is from the counting difficulty, for example, that many finite probability problems inherit their treachery.

Helpful formulas to assist with counting things abound. For example, the number of distinct subsets of a finite collection of n objects is 2^n. To prove this, imagine that each object is labelled 1, 2, . . . , n. We associate with each subset a binary number using the following rule of correspondence: If the object labelled k is a member of the subset, then the k*th* digit of the binary number is 1; otherwise it is 0. Clearly, there are exactly 2^n such distinct binary numbers, and therefore 2^n subsets.

The number of subsets of size k in a collection of n objects ($k \leq n$) is

(5) n!/k!(n-k)!

Expression (5) is called the combinations formula because it stands for the number of combinations of n things taken k at a time. It is also equivalent to the coefficient of the k*th* term in the expansion of the binomial $(a+b)^n$. The binomial coefficient is usually written $\binom{n}{k}$. Since the total number of subsets in a set of size n must equal the sum of all subsets of size k for each k = 0, 1, . . . , n; we have

(6) $\sum_{k=0}^{n} \binom{n}{k} = 2^n$

Can you think of a simple direct proof of expression (6)? (See note [2].)

Unfortunately, not every counting problem is easily reduced to a simple formula as in the preceding examples. For some problems, however, it is possible to exhibit counting algorithms. Several such Fortran programming examples, some quite technical, are given in the book *Combinatorial Algorithms* by Albert Nijenhuis and Herbert Wilf.

Listing 2. This program searches for the smallest composite number in the sequence 43, 47, 53, . . . Other sequences c + 2, c + 2 + 4, c + 2 + 4 + 6, . . . may be examined by changing the assignment at line 10.

```
10 C=41
20 FOR N=2 TO 20000 STEP 2
30 C=C+N
40 GOSUB 100
50 IF P=1 THEN GOTO 80
60 PRINT C-N;"+";N;"IS DIVISIBLE BY ";Q
70 STOP
80 NEXT N
100 P=0
110 Z=SQR(C)
120 FOR Q=3 TO Z STEP 2
130 X=C/Q
140 IF X=INT(X) THEN RETURN
150 NEXT Q
160 P=1
170 RETURN
180 END
```

Counting Ties at Pool

The game of pool is usually played with 15 balls numbered 1 to 15. For present purposes, assume that there are two players.

One variant, called "rotation," is scored by adding the values of all the balls pocketed by each player. To win this game a player must score 61 or more points. Sixty points to each player constitutes a tie-game. In general, ties are possible if and only if the total number of balls is 4•k or 4•k-1, where k = 1, 2, 3, . . .

It is apparent that the number of distinct ways in which rotation can be tied is even. For any particular tie-distribution of balls, exchanging the identity of the players yields a complementary tie-game.

Another way of expressing this symmetry principle is to say that for any particular ball, the number of tie-distributions in which the ball belongs to one player is equal to the number of ties in which the ball was scored by the other player.

When I first thought of the problem of counting ties at pool (rotation), I hoped that the symmetry concept would generalize very quickly to a formula for ties whose argument is the number of balls. If such a formula exists, however, I have not been able to find it.

To get an idea of how to design an algorithm for counting ties, it is helpful to consider how you would enumerate tie-distributions exhaustively using pencil and paper. The task is to be sufficiently systematic as to ensure against repetition and, at the same time, to permit no accidental omissions. With the 15-ball pool game this is surprisingly difficult.

However, with a smaller number the task is accomplished more easily. Table 1 enumerates all tie-distributions which include the 8-ball in a hypothetical game played with eight balls. (Let's call this the order-8 game.) A tie-score is obtained in the order-8 game when each player scores exactly 18 points.

Seven distributions are shown in the table. Taken together with the seven complementary distributions, there are 14 ways to tie in all.

There is a pattern in Table 1, but it is somewhat difficult to describe. Moreover, care is essential if the description is to form the basis of a general algorithm.

Listing 3 presents a program for counting ties in the order-n game. The actual counting part of this program is contained in the 12 lines numbered 70 through 180. The algorithm is based on the pattern in Table 1. Before studying Listing 3 you may wish to design your own counting program.

Table 1.

Ties at order-8 pool (rotation) which include the 8-ball.

```
8  7  3
8  7  2  1
8  6  4
8  6  3  1
8  5  4  1
8  5  3  2
8  4  3  2  1
```

Listing 3. Program to count ties at order-n pool (rotation). Variable C is the tie counter; N stands for the number of balls; I is the tie score value; S is the sum of balls pocketed in the current try. The array X contains the values of individual balls.

```
5 C=0
10 PRINT
20 INPUT "ENTER NUMBER OF BALLS";N
30 T=(N*N+N)/4
40 IF T<>INT(T) THEN GOTO 220
50 DIM X(N)
60 IF T<>N THEN GOTO 70
64 PRINT "TRIVIAL CASE...THERE ARE 2
    TIES"
66 STOP
70 X(1)=N
80 FOR I=2 TO N
90 X(I)=X(I-1)
100 X(I)=X(I)-1
110 IF X(2)<1 THEN GOTO 200
120 IF X(I)>=1 THEN GOTO 150
130 I=I-1
140 GOTO 100
150 GOSUB 250
160 IF S=T THEN GOSUB 300
170 IF S>=T THEN GOTO 100
180 NEXT I
200 PRINT "TOTAL POSSIBLE TIE SCORES
     =";2*C
210 STOP
220 PRINT "ERROR: NUMBER OF BALLS MUST ="
230 PRINT "4*K OR 4*K-1, K AN INTEGER."
240 GOTO 10
250 S=0
260 FOR J=1 TO I
270 S=S+X(J)
280 NEXT J
290 RETURN
300 C=C+1
305 PRINT
310 FOR J=1 TO I
320 PRINT X(J);
330 NEXT J
340 RETURN
350 END
```

Line 30. While line 40 tests to see that a tie game is indeed possible.

It is evident that in an order-n game, neither player can pocket more than n balls. So at line 50 we dimension an array to contain values of the balls pocketed in tie trys including the n-ball (see line 70). There is one trivial case (n = 3) in which the value of a tie score is equal to n. This case is disposed of at line 60.

As was shown in the preceding section there are 2^n subsets of a set of n elements. Thus there are 2^n total different games of order-n rotation neglecting the order in which balls are pocketed by the players. For the usual order-15 game this is the familiar number 32,768.

As in Table 1, the program uses the principle that the number of ties with the n-ball equals the number of ties without it. Line 70 pockets the n-ball.

The counting loop structure is somewhat complicated because the index variable is altered within the loop as well as by the NEXT statement. The value of I denotes the number of balls pocketed in the current try for a tie-distribution.

To understand how the counting algorithm works, it is helpful to trace the execution of the program for at least one row of the 8-ball problem. Unfortunately this analysis is too detailed to include here.

On first entering the FOR loop, the n-1 ball is pocketed. The value of each pocketed ball is set up experimentally at line 100. The loop (and program) terminating test is performed at line 110.

Whenever the last ball pocketed has an invalid value (< 1), "unpocket" it and decrement the value of the previous ball (lines 120-130). When the last ball is valid, line 150 transfers control to a subroutine (line 250) which computes the score for each try.

If a tie is found (line 160), the subroutine at line 300 increments the tie counter and prints the distribution. Printing distributions greatly enhances the interest of the program. Finally, line 170 decides whether to decrement the value of the current ball or to pocket another ball for the next try.

Summary

This article has described three recreational programming problems. Recreational problems are helpful in developing analytical and programming skills. Their real appeal, though, is in their capacity for discovery. I have tried to share the sense of enjoyment one experiences on finding something unexpected or curious. Who knows whether the next problem may lead to a truly interesting finding?

Footnotes

[1] Obviously, not every polynomial $\underline{P}$ is divisible by its constant term. But, if N is an integer such that $P(N) = M$, then it is easily shown that for any integer k, M divides $P(N + k \cdot M)$. Since $\underline{P}$ cannot assume any given value more than n times, where n is the degree of $\underline{P}$, there is sure to be a value of $P(N + k \cdot M)$ distinct from $\pm M$ for some choice of k.

[2] Since $\binom{n}{k}$ is the binomial coefficient,

$$\sum_{k=1}^{n} \binom{n}{k} = (1+1)^n = 2^n.$$

■

NOTEBOOK COMPUTING

Selecting a notebook portable computer under $1000

David H. Ahl

Now that the big three in notebook portables (Tandy, NEC, and Epson) have all released their second generation of machines, perhaps it is time to take a look at just what you can get for $1000 or less. The way we see it, there are five serious contenders: the Tandy Models 100 and 200, NEC PC-8201 and 8401 Starlet, and Epson PX-8 Geneva. Unfortunately, none of them emerges as a clear winner.

As in selecting any kind of computer, it is important to start out by defining exactly what you intend to do with the machine today, and what you think you might like to do with it in the future. Then, a table of specifications starts to take on real meaning as you compare it against your requirements.

As we look at the five major contenders in the under $1000 range, we cannot put ourselves in your place. Instead, we'll try to identify the strong and weak points of each machine and let you draw your own conclusions.

Common Characteristics

All five machines use a CMOS equivalent of the old workhorse Z80A microprocessor. All of them have full-stroke keyboards with at least 56 keys. All have three or four fixed function keys and eight to ten programmable ones. All of the machines are virtually the same size and are truly portable with weights ranging from 3.8 to 5.0 lbs. All have an RS-232 port and connection for an external cassette recorder. All of them have built-in word processing software (of quite different capabilities) and telecommunications software.

An optional floppy disk unit is available for all of the machines; the Epson and NEC units are 3 1/2" battery operated units, while the Tandy unit is 5 1/4" and AC operated. A 3 1/2" battery operated unit is available for the Tandy computers from Holmes Computer Products.

Four of the five computers have a parallel port, bar code reader port, built-in 300 baud modem, and Microsoft Basic. Also, an optional CRT adapter is available for four of the five machines.

Enough of the similarities; what are the differences?

NEC PC-8401 Starlet

This machine has the largest display of the group (16 lines x 80 characters). It also has the most ROM (96K) and ties with the Epson for maximum RAM (64K). The ROM contains the operating system (CP/M 2.2) plus full-featured word processing, spreadsheet, and telecommunications software. Another plus for the Starlet is the availability of external plug-in 32K memory cartridges.

Unfortunately, no notebook computer under $1000 emerges as a clear winner.

The most glaring weakness of the 8401 is the absence of a programming language; not only is Basic not built in, but no language is available for the computer. *Personal Filer* is the best database package of any of these machines. However, it is still not particularly versatile.

If you need a full-featured word processor and spreadsheet with lots of room for files, and don't want to do any programming, the 8401 is probably the best of the lot.

Epson PX-8 Geneva

The Geneva has the best keyboard of the group with some thoughtful touches such as LEDs to indicate caps lock, numeric keypad, and insert mode. Its 32K of ROM contains CP/M 2.2 but unfortunately the applications software is on plug-in ROM packs, only two of which can reside in the machine at the same time. The most popular four ROM packs are Basic, *Portable WordStar, Portable Calc* (including *Portable Scheduler*), and CP/M Utilities.

Alone in the group, the Geneva has a built-in microcassette recorder which makes up for its inability to store more than five files in memory. For additional storage, Epson also offers a clamp-on RAM pack (64K or 128K) and a 3 1/2" battery-operated floppy disk drive. The Geneva has built-in rechargeable batteries which have the longest life of any of the five machines.

Weak points include the lack of a parallel port (means you must have a serial printer), lack of a standard RS-232 connector, and non-availability of a CRT adapter. Also, we found that CP/M on the Geneva was not quite as user-friendly as it is on the Starlet.

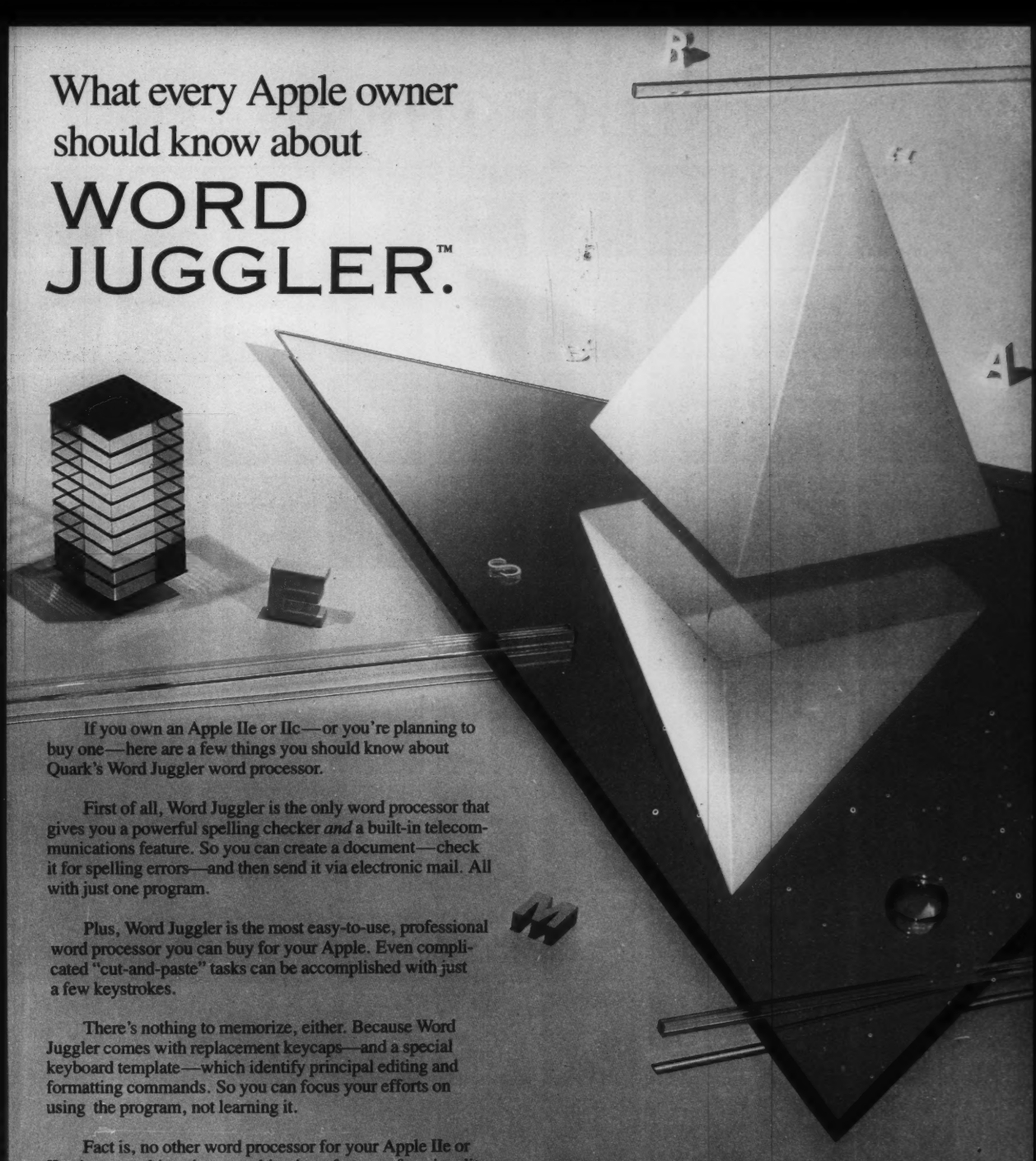
If most of your work is with two applications (so you don't have to change ROM packs constantly), if you need built-in mass storage (microcassette), and if you need to go a long time between AC outlets, the Geneva is probably your best choice.

Tandy Model 200

Like the Geneva, the Model 200 has a mid-size display, but it is arranged differently (16 lines x 40 characters) and is physically larger than the one on the Geneva. The Model 200 is basically an enhanced Model 100, the major differences being a larger display, more memory, better arrangement of cursor control keys, and built-in spreadsheet software (*Multiplan*).

Text, the word processing software package, does not have the many features of *WordStar* (on the 8401 and PX-8), but it is considerably easier to use. Also, the lack of the CP/M operating system (or any operating system for that

What every Apple owner should know about WORD JUGGLER™.



If you own an Apple IIe or IIc—or you're planning to buy one—here are a few things you should know about Quark's Word Juggler word processor.

First of all, Word Juggler is the only word processor that gives you a powerful spelling checker *and* a built-in telecommunications feature. So you can create a document—check it for spelling errors—and then send it via electronic mail. All with just one program.

Plus, Word Juggler is the most easy-to-use, professional word processor you can buy for your Apple. Even complicated "cut-and-paste" tasks can be accomplished with just a few keystrokes.

There's nothing to memorize, either. Because Word Juggler comes with replacement keycaps—and a special keyboard template—which identify principal editing and formatting commands. So you can focus your efforts on using the program, not learning it.

Fact is, no other word processor for your Apple IIe or IIc gives you this unique combination of power, functionality and ease of use. And if all these advantages aren't compelling enough, check the price. Suggested retail is only $189.

So visit your favorite dealer today. Ask for a complete demonstration—and for a copy of our brochure, "What Every Apple Owner Should Know About Word Juggler." If you don't have a favorite dealer, but would like one, just call 1 (800) 543-7711. We'll fix you up.

Quark™ INCORPORATED

2525 West Evans, Suite 220
Denver CO 80219

Quark and Word Juggler are trademarks of Quark Incorporated. Apple is a registered trademark of Apple Computer, Inc.

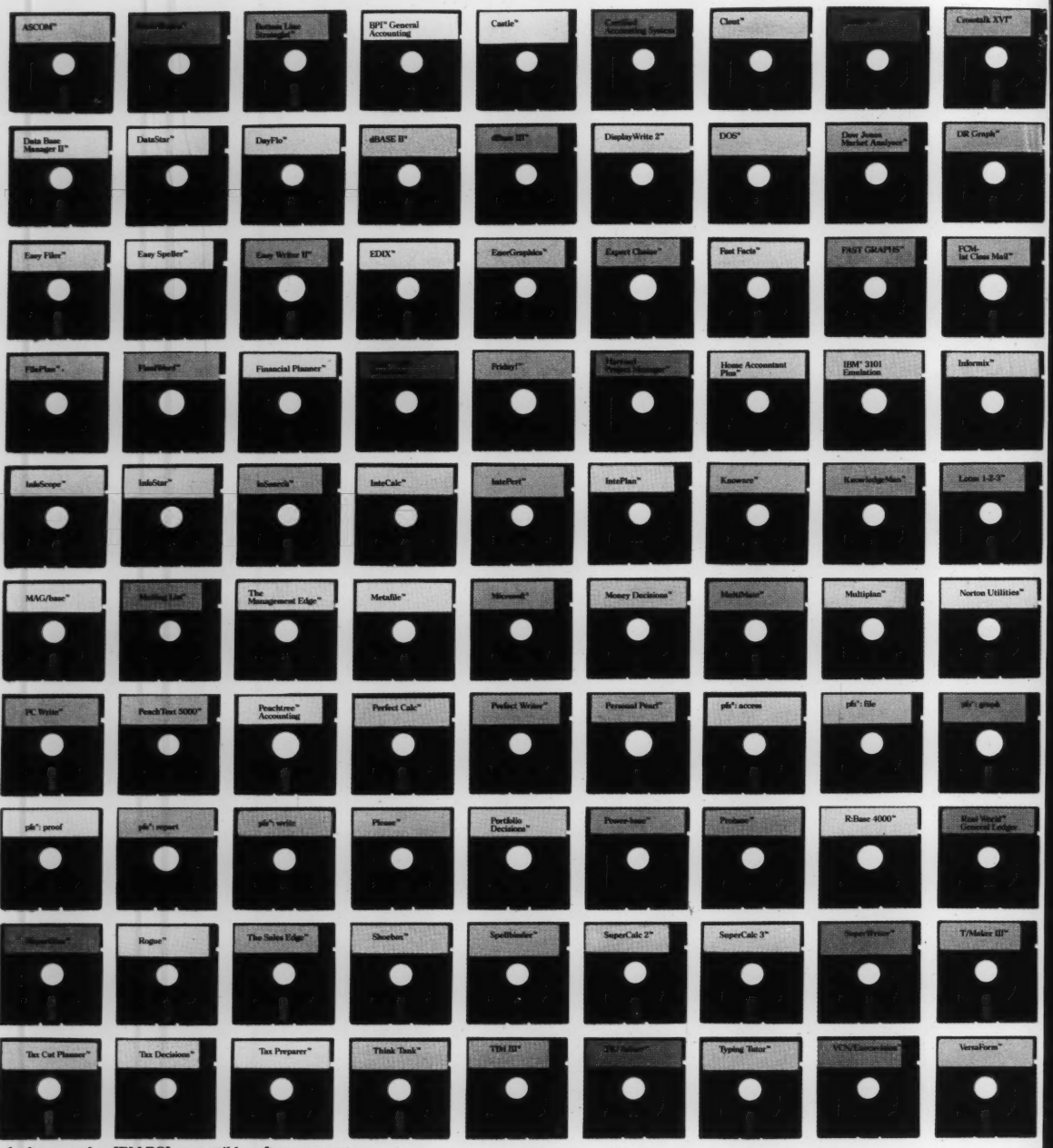
Ask about our specially-priced educational version.

Copyright 1985, Quark Incorporated

Photography by Barbara Kasten

CIRCLE 158 ON READER SERVICE CARD

ALL OF THESE...



And many other IBM PC® compatible software programs.

ASCOM™ is a trademark of Dynamic Microprocessor. **Basic/Basica™** is a registered trademark of Microsoft. **Bottom Line Strategist™** is a trademark of Ashton-Tate. **BPI™ General Accounting** is a trademark of BPI. **Castle™** is a trademark of Freeware Games. **Certified Accounting System™** is a trademark of Certified Software. **Cloat™** is a trademark of Microtim. **Condor 3™** is a registered trademark of Condor Computer. **Crosstalk XVI™** is a trademark of Microstuf. **Data Base Manager II™** is a trademark of Alpha Software. **DataStar™** is a trademark of MicroPro. **DayFlo™** is a trademark of DayFlo, Inc. **dBASE II™** is a registered trademark of Ashton-Tate. **dBASE III™** is a trademark of Ashton-Tate. **DisplayWrite 2™** is a trademark of IBM. DOS™ is a registered trademark of Microsoft™ / IBM. **Dow Jones Market Analyser™** is a trademark of Dow Jones. **DR Graph™** is a trademark of Digital Research. **Easy Filer™** is a trademark of I.U.S. **Easy Speller™** is a trademark of I.U.S. **Easy Writer II™** is a trademark of I.U.S. **EDIX™** is a trademark of Emerging Technology. **EnerGraphics™** is a trademark of Enertronics. **Expert Choice™** is a trademark of Decision Support. **Fast Facts™** is a trademark of Innovative Software. **FAST GRAPHS™** is a trademark of Innovative Software. **FCM—1st Class Mail™** is a trademark of Continental Software. **FilePlan™** is a trademark of Chang Labs. **FinalWord™** is a trademark of Mark of the Unicorn. **Financial Planner™** is a trademark of Ashton-Tate. **Forte™ 3270 Emulation** is a trademark of Forte Data System. **Friday!™** is a trademark of Ashton-Tate. **Harvard Project Manager™** is a trademark of Harvard Software. **Home Accountant Plus™** is a trademark of Continental Software. **IBM® 3101 Emulation** is a registered trademark of IBM. **Informix™** is a trademark of Relational Database. **InfoScope™** is a trademark of Userview Corporation. **InfoStar™** is a trademark of MicroPro. **InSearch™** is a trademark of Menlo Corporation. **InteCalc™** is a trademark of Schuchardt Systems. **IntePert™** is a trademark of Schuchardt Systems. **IntePlan™** is a trademark of Schuchardt Systems. **Knoware™** is a trademark of Knoware. **KnowledgeMan™** is a trademark of Micro Data Base System. **Lotus 1-2-3™** is a trademark of Lotus Development. **MAG/base™** is a trademark of MAG Software. **Mailing List™** is a registered trademark of Alpha® Software. **Management Edge, The™** is a trademark of Human Edge. **Metafile™** is a trademark of Sensor Based Systems. **Microsoft® Project** is a registered trademark of Microsoft. **Money Decisions™** is a trademark of Eagle Software Pub. **MultiMate™** is a trademark of MultiMate International. **Multiplan™** is a trademark of Microsoft. **Norton Utilities™** is a trademark of Peter Norton. **PC Write™** is a trademark of Quicksoft. **PeachText 5000™** is a trademark of Peachtree Software. **Peachtree™ Accounting** is a trademark of Peachtree Software. **Perfect Calc™** is a trademark of Perfect Software. **Perfect Writer™** is a trademark of Perfect Software, Inc. **Personal Pearl™** is a trademark of Pearlsoft. **pfs™:access** is a registered trademark of Software Publishing. **pfs™:file** is a registered trademark of Software Publishing. **pfs™:graph** is a registered trademark of Software Publishing. **pfs™:proof** is a registered trademark of Software Publishing. **pfs™:report** is a registered trademark of Software Publishing. **pfs™:write** is a registered trademark of Software Publishing. **Please™** is a trademark of Hayes Micro Products. **Portfolio Decisions™** is a trademark of Eagle Software Pub. **Power-base™** is a trademark of Power-Base Systems. **Probase™** is a trademark of Probase Group. **R:Base 4000™** is a trademark of Microrim. **Real World™ General Ledger** is a trademark of Real World Corp. **ReportStar™** is a trademark of MicroPro. **Rogue™** is a trademark of Artificial Intel. **Sales Edge, The™** is a trademark of Human Edge. **Shoebox™** is a trademark of Techland Systems. **Spellbinder™** is a trademark of Lexisoft. **SuperCalc 2™** is a trademark of Sorcim. **SuperCalc 3™** is a trademark of Sorcim. **SuperWriter™** is a trademark of Sorcim. **T/Maker III™** is a trademark of T/Maker Co. **Tax Cut Planner™** is a trademark of United Micro Systems. **Tax Decisions™** is a trademark of Eagle Software Pub. **Tax Preparer™** is a trademark of HowardSoft. **Think Tank™** is a trademark of Living Videotext. **TIM III™** is a registered trademark of Innovative Software. **TK! Solver™** is a trademark of Software Arts. **Typing Tutor™** is a trademark of IBM (Microsoft). **VCN/Executivision™** is a trademark of Prentice Hall Inc. **VersaForm™** is a trademark of Applied Software Tech.

ARE BETTER WITH THIS.

Meet DESQ, The Multi-Window Software Integrator. That's Software Integrator not Integrated Software Package. The difference between them makes all the difference in the world because an Integrator allows you to keep using all the applications you know and love instead of limiting you to a single manufacturer's programs.

Now you can go ahead and integrate all your software without any of your current applications becoming obsolete. Including the custom programs you've already invested substantial time and money in.

In fact, DESQ will make your stand-alone applications work as a more powerful, more effective whole. It actually adds capabilities to your programs.

That's because DESQ has an incredible number of special features. First, of course, are WINDOWS, multiple spaces created by DESQ on your screen that show you several different programs. Not only does DESQ let you use up to 9 programs at once, it lets you decide how you see them.

DESQ also has MARK AND TRANSFER, the ability to transfer data between programs and position the information exactly; and NOTEPAD, the feature that lets you take notes and save ideas while you're working on another program. Then there's LEARN, DESQ's ability to remember keystrokes and commands. FILE AND PRINT is another terrific feature that lets you get at DOS while working on something else.

Best of all, DESQ is open-ended. It has the intelligence and flexibility to grow with you and your workload. You can add any number of applications or custom programs as long as they'll run on an IBM PC® or compatibles. You'll need 256K for DESQ plus memory for your largest program and a Winchester Disk running DOS 2.0, minimum. If you want to know where to get DESQ just call 800 845-6621 (outside California) for the nearest DESQ dealer.

With DESQ, you and your software are going to be a lot better together.

DESQ™

The possibilities are endless.

Quarterdeck Office Systems

1918 Main Street, Santa Monica, California 90405 • Telephone: 213-392-9851

CIRCLE 136 ON READER SERVICE CARD

matter) means the machine is more approachable and more forgiving—a boon to klutzy users like me.

In general, with its considerably less powerful and versatile software than that on the 8401 and PX-8, the Model 200 seems more like a 1 1/2 generation effort. Nevertheless, if you need a good spreadsheet, Basic, and an occasional word processor in a very forgiving machine, the Model 200 would be your best choice.

Tandy Model 100

With all the second generation machines, why would you look at a Model 100? One reason: price. When the dust settles, you have to ask yourself, are a twice-as-large display, spreadsheet software, and decent cursor keys worth over $400? After all, you can beef up the Model 100 with third party add-on memory (PG Design, Purple Computing, etc.) and an excellent spreadsheet on ROM (*Lucid* from Portable Computer Support Group). Furthermore, there are several other RAM-resident spreadsheets available for the Model 100.

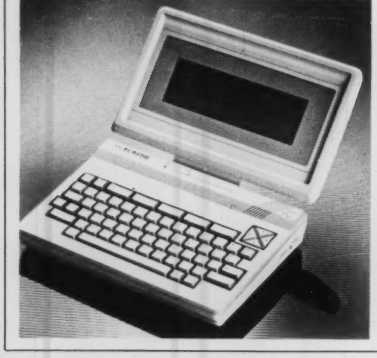
With all the second generation machines, why would you look at a Model 100?

Buy a Model 100 at a discount, some add-on memory and additional software, and the only thing your extra $300-400 for the Model 200 gets you is eight more lines on the display and a diamond-shaped cursor key cluster. Is it worth it? Only you can decide.

Comparison of Notebook Portable

	Epson PX-8 Geneva	NEC PC-8401A Starlet
Size	8.5" x 11.5" x 1.8"	8.5" x 11.75" x 2.2"
Weight	5.0 lbs.	4.7 lbs.
Display: text resolution	8 lines x 80 chars	16 lines x 80 chars
Graphics resolution	64 x 480 pixels	128 x 480 pixels
Keyboard	63 keys (LED for caps lock, numeric, insert mode)	66 keys 7 function keys
Single keystroke functions	4 fixed, 10 programmable	3 fixed, 10 programmable
CPU	Z80 (CMOS equiv.)	Z80 (CMOS equiv.)
RAM	64K	64K
Max. files in memory	5	24
ROM	32K	96K (3 x 32K)
External RAM	64K ($329) or 128K ($460)	32K cartridge
External ROM	32K cartridges	No
RS-232 port	Yes	Yes
Parallel port	No	Yes
Other ports	Serial, cassette, bar code, system bus	Cassette, voice phone, direct modem, system bus
Built-in mass storage	Microcassette	None
Floppy disk (optional)	3½" battery opn ($599)	3½" battery opn ($599)
Word processing	Portable WordStar	WordStar-To-Go
Spreadsheet	Portable Calc	Calc-To-Go
Database manager	None	Personal Filer
Telecommunications	TERM	Telcom
Other software	Portable Scheduler	None
Operating system	CP/M2.2	CP/M 2.2
Programming	Microsoft Basic	None
Modem (built in)	300 baud	300 baud
Modem (optional)	1200 baud direct connect Acoustic coupler	1200 baud direct connect
CRT adapter	No	Optional ($249)
Battery life	15 hours	8 hours
Suggested retail price	$995	$999

NEC PC-8401 Starlet



Epson PX-8 Geneva

Tandy Model 200

Computers Under $1000

Tandy Model 200	Tandy Model 100	NEC PC-8201
8.5" x 11.75" x 2.2"	8.5" x 11.7" x 2.0"	8.5" x 11.8" x 2.4"
4.5 lbs.	3.8 lbs.	3.8 lbs.
16 lines x 40 chars	8 lines x 40 chars	8 lines x 40 chars
128 x 240 pixels	64 x 240 pixels	64 x 240 pixels
56 keys 12 function keys	56 keys 12 function keys	58 keys 6 function keys
4 fixed, 8 programmable	4 fixed, 8 programmable	3 fixed, 10 programmable
Z80 (CMOS equiv.)	Z80 (CMOS equiv.)	Z80 (CMOS equiv.)
24K	8K (32K max.)	16K (64K max.)
46	19	21 per bank
72K	32K	32K
72K	32K (third party)	32K cartridge
104K	32K (third party)	No
Yes	Yes	Yes
Yes	Yes	Yes
Cassette, voice phone, bar code, system bus	Cassette, bar code, system bus	Cassette, bar code, system bus
None	None	None
5¼" AC operation	5¼" AC operation	3½" battery opn ($799)
Text	Text	Text
Multiplan	No	None
Address organizer	Address organizer	None
Telcom	Telcom	Telcom
Scheduler	Scheduler	None
None	None	None
Microsoft Basic	Microsoft Basic	Microsoft Basic
300 baud	300 baud	No
None	None	300 baud acoustic or direct connect
Optional	Optional	Optional
16 hours	8-10 hours	8-10 hours
$999	$599	$499

NEC PC-8201

If you think a Model 100 might meet your needs, then so might an 8201. The main difference between the two machines is that the Model 100 has a built-in modem whereas the 8201 has better cursor control keys (the same as the Model 200), better Basic program editing, and, optionally, more built-in and external memory. NEC also sells a portable 3 1/2" battery (or AC) operated disk drive.

PC-8201s are being sold today at substantial discounts. A deeply discounted 8201 coupled with a NEC disk drive or SideCar memory pack (up to 128K) from Purple Computing makes an attractive alternative to one of the three new units at about the same price. If you're satisfied with the limited software and display, but looking for more memory, this is probably the way to go. ■

Firms Mentioned in This Column

Holmes Computer Products
5175 Greenpine Dr.
Salt Lake City, UT 84123
(801) 261-5652

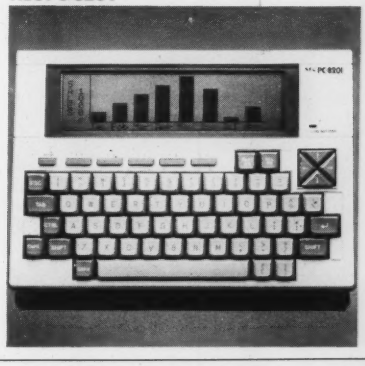
PG Design Electronics
66040 Gratiot
Richmond, MI 48062
(313) 727-2744

Portable Computer Support Group
11035 Harry Hines Blvd.
Dallas, TX 75229
(214) 351-0564

Purple Computing
2068 Ventura Blvd.
Camarillo, CA 93010
(805) 987-4788

Tandy Model 100

NEC PC-8201



"Do you have a lap computer that will fit this lap?"

APPLE CART

More on the Scribe, a programming contest, and Apple snuggles up to IBM

Owen Linzmayer

Happy Birthday Apple IIc! Has it really been a year since you made your debut at the Moscone Center in San Francisco? My how you have grown. This month we take a look back at your first year—at the excitement and disappointment—and attempt to see what the future holds for the youngest member of the Apple family. We also have a follow-up on the Scribe printer, the Great Apple Programming Contest (win free software!), and a brief look at some Apple products that will change the way "the rest of us" do business. Hi ho, hi ho, it's off to work we go.

IIc—Year One

In a great execution of "event marketing," Apple introduced the IIc to an enthusiastic audience at San Francisco's Moscone Center—you remember, the site of the Democratic national convention. Apple claims it took orders for over 50,000 IIc computers that very day. Following the warm reception of the Mac, it initially looked as if Apple had another blockbuster product on their hands, and President Sculley predicted that Apple would sell half a million units by year-end. Maybe John spoke too soon.

The Apple IIc, though a perfectly capable machine (and a sexy one at that), was immediately criticized by trade publications for its lack of slots. I am perfectly aware of the fact that the Apple IIc contains the "most popular" peripherals already installed in virtual slots, but along with many third-party hardware manufacturers, I lament that Apple didn't provide external access to at least one expansion slot. Has this been the case, I think Sculley might have realized his 500,000 sales expectations.

Heralded as a portable computer, as of this writing the IIc has yet to get its traveling papers in the form of a full-screen LCD and battery pack. Back in April of last year Apple showed off a full-screen liquid crystal display that would connect to the IIc via the video expansion port. This flat-panel screen is capable of displaying 80 columns by 24 lines of text and even double hi-res animated graphics. Initially this product was slated for release in the fourth-quarter of 1984, but Cupertino continued to push back the release date. Latest word has it that the LCD flat-panel display will be in stores by the time you read this.

As of this writing the IIc has yet to get its traveling papers in the form of a full-screen LCD and battery pack.

But when you think about it, how many people will be willing to part with several hundred dollars just so they can lug around a "portable" IIc? I put the word portable in quotes because there is still no official word on the official battery pack that is necessary for the IIc to take to the roads and skyways (Discwasher offers a carrying case with built-in power supply).

Enough of unfulfilled hardware promises, what about all that great software that was going to take advantage of the built-in mouse technology? Well, to be honest, with the exception of a few programs such as Odesta's *How about a Nice Game of Chess*, the mouse-icon user interface for the II line just hasn't caught on. Not yet at least. If Apple had bundled a mouse into the IIc package, software houses would have flocked to support it.

There is still a chance that the mouse-icon user interface will become as widely accepted for the II line as it has on the Mac, but such acceptance hinges on a recently available IIe ROM upgrade offered by Apple. Four chips are involved, the most important of which is the 65C02, the cpu used in the IIc.

Basically the 65C02 is a low-power chip compatible with the 6502 (used in the rest of the II line), the main difference between the two being that the 65C02 contains special codes that optimize the programmability of the mouse as an input device. This upgrade ensures the compatibility of IIc software for use on the IIe. If enough IIe owners purchase the upgrade I would expect software manufacturers to begin a full-fledged effort to support the mouse-icon interface on the II family.

I'm going to end my diatribe on IIc deficiencies without even mentioning the slow serial port problem (see December 1984 Apple Cart). Let me say for the record that I own a IIc, and though sometimes I seem critical, I don't regret my purchase. I can think of no other computer for the price that is so attractive and operates with such beautiful simplicity.

Scribe Errata

I reviewed the Apple Scribe thermal printer in this column in December of 1984, at which time I recommended that potential buyers save their money and purchase the Apple Imagewriter instead. This recommendation was due largely to inadequacies of the thermal transfer process employed by the Scribe to print text and graphics. I found the output highly inconsistent and not up to Apple's standard of quality. Recently I received a letter from Linda Merrill of the Apple II Public Relations Office which prompted me to drag the Scribe out of the closet and take a second look. The letter was printed with a Scribe and reads as follows:

"I am responding to the Apple Scribe printer review article which appeared in your December issue.

"The print quality of the Apple Scribe printer, like all thermal transfer

printers, is directly affected by the smoothness of the paper used. It is the paper that unlocks the true potential of the Scribe. By using a smooth surfaced paper, the Scribe has the capability to produce print quality that was never before available in a printer of Scribe's price class. The article did not specify the type of paper used in testing; we recommend Hammermill Thermal Transfer Paper.

"Ribbon prices are quite different from those indicated in *Creative Computing's* article. Black ribbons have been available since August at $4.99 (not $6.99). Color ribbons are now priced at $5.99 and were never sold at $9.99. We would appreciate it if you would provide this information to your readers."

Thanks for the letter Linda, I always appreciate fan mail. When I reviewed the Scribe I specifically stated that "Apple recommends any 16 to 20 pound smooth finish stock or Xerox 4024 copier paper." For my test purposes, I used the Xerox paper as it gave me the best print quality of all the papers I tried. I have since tracked down a ream of Hammermill paper and must admit that the print quality is greatly improved with this paper.

Even in light of what you have brought to my attention, Linda, I must still recommend the Imagewriter in lieu of the Scribe for several reasons. First of all, Hammermill Thermal Transfer paper is expensive, and the people that opt to buy the Scribe do so because it is an inexpensive way to get hardcopy—they shouldn't be burdened with the cost of special paper. Second, the Scribe ribbons are also relatively expensive, and are consumed far too quickly to make them economical; the low price of the Scribe is offset by the high cost of ribbons and paper. But the Scribe is not alone—none of the thermal transfer printers I have seen to date offers what I consider adequate print quality for the money.

Write Away!!!

Ok, you've asked for it, so here it is. The Great Apple Programming Contest. Many readers have been complaining about the high price of commercial software, so here it is, a programming contest that will add to the body of public domain software. And there are prizes, too. Sound good? Read on for details.

To enter the contest, simply mail us your favorite piece of code in any language for any Apple computer in machine-readable format (program listings not acceptable, unless under 10 lines). If you have a CompuServe account, feel free to upload your submissions directly to the Apple Cart section in the Creative Computing SIG (go pcs-22 from any function prompt). Incidentally, the best of the runners-up will be posted on CompuServe for easy downloading. The winners (especially those of short to medium length) will stand a good chance of being published in the magazine.

There will be software prizes in each of the following categories: graphics, utility, entertainment, nonsense, best overall, and best short program. The Mac, the II, and the III will have their own sets of winners, so there are plenty of chances to win.

Please include with your submission a short description of what the program does, what computer it runs on (list all requirements), a program listing, your address and phone number, and what type of software package you prefer if you win. The contest ends May 15, 1985. Winners will be notified within one month of that date. All submissions become the property of *Creative Computing*. The contest is open to all readers, except employees of Ziff-Davis Publishing Company. There you have it—a most generous offer if I do say so myself. What are you waiting for? Power up your system and get those disk drives spinning, you've got a contest to win.

Working in the Mac Office

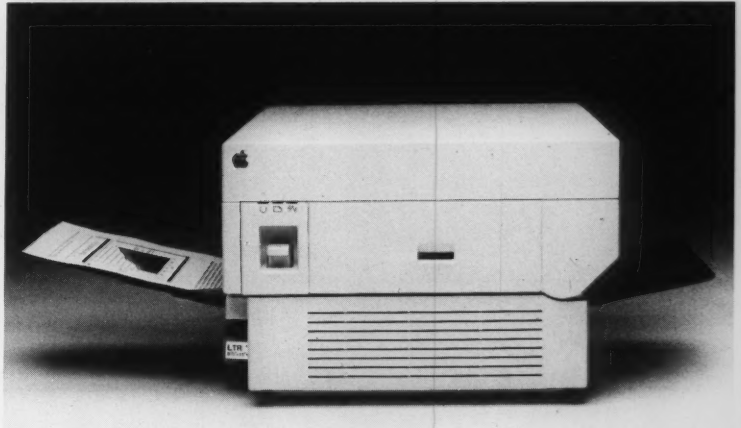
At its annual shareholder's meeting on January 23, Apple announced several new products that make the Macintosh a viable contender in the fight to keep IBM from maintaining its stranglehold in the business computer market. Although a more in-depth evaluation will appear in a subsequent issue, a brief overview of these products is in order now.

The Macintosh Office is centered around AppleLink, a local area network that will support as many as 32 computers or peripheral devices, including other AppleLink networks. The cost for each node of the network is $50, compared to $300 to $1000 for connections in other similar networks. The Mac Office allows workers to share information and greatly improves communications and productivity in the work environment.

Probably the most important thing to note is that the AppleLink can connect not only Macs, but IBM personal computers as well. Imagine that; it's akin to the U.S. allowing the Soviet Union to borrow the keys to the space shuttle. Actually, it is a brilliant move by Apple. You see, there are so many IBM PCs entrenched in the corporate world that managers are hesitant to buy Macintosh computers. By ensuring that with AppleLink the Mac can communicate with IBM computers, Apple just may infiltrate the coveted business market now dominated by IBM.

Two other very important announcements made at the shareholder's meeting were the introduction of a laser printer, named LaserWriter, and the reduction in price of the Mac line of computers. The LaserWriter can produce near typeset-quality text and high-resolution graphics all at a maximum rate of eight pages per minute. The out-

The LaserWriter Printer



Help Make Your Dreams Come True!

Get Rich: Financial Strategies™
Get Rich: Real Estate Planning™
Get Rich: Insurance Planning™*

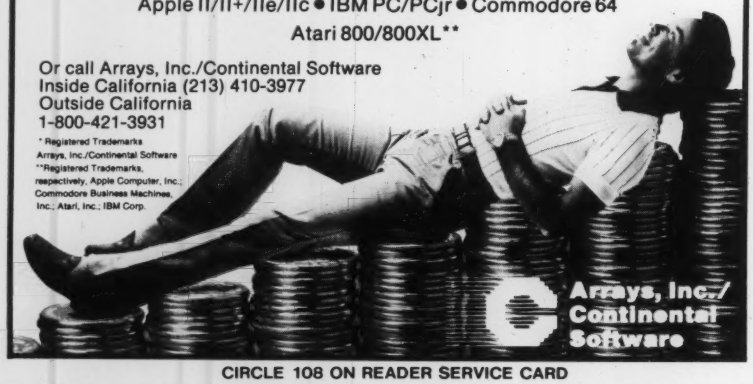
Now Available
at your software dealer

Suggested Retail
Only **$59.95** each

Apple II/II+/IIe/IIc • IBM PC/PCjr • Commodore 64
Atari 800/800XL**

Or call Arrays, Inc./Continental Software
Inside California (213) 410-3977
Outside California
1-800-421-3931

* Registered Trademarks Arrays, Inc./Continental Software
**Registered Trademarks, respectively, Apple Computer, Inc.; Commodore Business Machines, Inc.; Atari, Inc.; IBM Corp.



CIRCLE 108 ON READER SERVICE CARD

Software That Works For Generations

6 Types of Charts and Sheets
Indices
User Fields
Notes, Footnotes and Sources
No Limits
Adapts to Your Hardware
Comprehensive
Easy to Use
And Much, Much More

Send for brochure and sample printouts.

Family Roots includes detailed manual and 2 full diskettes of programs for your Apple II, IBM PC, Commodore 64 and CP/M.*

Other genealogy software also available.

Price $185. Satisfaction Guaranteed.

American Express, Visa & Mastercard Accepted

* Trademarks for Apple Computer, Inc., International Business Machines, CBM, Inc., & Digita Research.

Family Roots™

QUINSEPT, INC.
P.O. Box 216, Lexington, MA 02173
(617) 862-0404

CIRCLE 149 ON READER SERVICE CARD

MATH CHAMPIONS
come from
OLYMPUS

THE INFINITE MATH SERIES

Quadratic Equations
Geometry
Linear Equations
Simple Inequality
Functions and Graph
Expansion of Expressions
Simultaneous Equations
Statistics and Graph
Greatest Common Factor

$39.95 each.

APPLE • COMMODORE 64

OLYMPUS EDUCATIONAL SOFTWARE, INC.
1660 No. Hotel Circle, Suite 310
San Diego, California 92108
(619) 296-8555

CIRCLE 139 ON READER SERVICE CARD

put of the LaserWriter must be seen to be believed. Also, since it can emulate the Diablo 630 daisywheel printer, the LaserWriter can be used by IBM-compatible personal computers.

In addition to renaming the Lisa 2/10 computer the Macintosh XL, Apple announced that it was reducing the price of the machine to $3995. The Fat Mac has also been reduced from $3195 to $2795. Also note that the price of the 128K to 512K upgrade has been slashed several hundred dollars, bringing it down to $700.

By ensuring that with AppleLink the Mac can communicate with IBM computers, Apple just may infiltrate the coveted business market now dominated by IBM.

If that is still out of your reach, you may want to contact Centra Systems Inc. of Agoura Hills, CA. They provide a functionally and electronically equivalent upgrade for $350 plus shipping. Their work includes a 90-day warranty and is certainly worth looking into if you can afford to be without your Mac for a week or two while the upgrade is being performed. ■

Firms Mentioned in This Column:

Apple Computer Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 973-2222

International Business Machines Inc.
P.O. Box 1328
Boca Raton, FL 33432
(305) 998-6007

Discwasher
1407 N. Providence Rd.
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941

Centra Systems, Inc.
5308 Derry Ave., Suite C
Agoura Hills, CA 91301
(818) 889-6246

TANDY GRAM

Third-party DOSes make Color Computer programming easier

Jake Commander

The following was sent to me from Spectrum Projects in San Jose, CA. In true cloak-and-dagger style, there was no accompanying letter, so I'm assuming the sender is using me as a forum. It concerns a new version of the Color Computer and is reprinted exactly as I received it.

"Speaking of newer and newer versions of CoCo II: The very latest is 26-3136A and it has a totally revised board. Once again, Tandy has pulled the rug out from under third-party suppliers. For instance, non-standard Texas Instruments RAM chips are installed. The 16K computer uses TMS4416 chips which are 18-pin 4x16's, so only two sockets are required, not the eight sockets that we are accustomed to. Because these chips require a 256 (versus a 128) cycle refresh, a new SAM chip is required—a 74LS785. (The previous one was a 74LS783.)

"The VDG (video display generator) is the same, but a new one with true lower case will be in the 26-3136B version of CoCo II and CoCo III. A new 28-pin ROM (the old version was 24-pin) is used for Color Basic and Extended Color Basic (yes, one chip for both Basics). Basic is now version 1.3 and is soldered in rather than socketed. If a non-extended 16K computer is made with this board, it will be supplied with a 24-pin Basic chip plugged into a 28-pin socket, or maybe soldered into the location. There are 12-pin connectors near the RAM chips and some jumpers marked '128K RAM' so we can expect some kind of a satellite board next year for that upgrade. (The 64K upgrade may be via satellite board as well.) The 74LS244 buffer has been changed to a 74LS623.

"Finally, the disk controller has been completely redesigned. The part number (AX7980) is the same but there are fewer chips used. They are: a new Western Digital 1773, which is a 28-pin floppy disk controller chip, and seven others (74LS74, 74LS14, 74LS139, 74LS02, 74LS273, and two 74LS16s). The new controller clock speed is 16 MHz rather than 10 MHz."

Thanks to Spectrum Projects for that information. It shows how difficult it can be for independent third-party suppliers to keep abreast of Tandy's intentions at the hardware level. The Color Computer continues to be rejuvenated—maybe Tandy hopes that it will become their Apple II.

Motorola has had a chip set available for some time which allows a high-resolution display with 64 different colors. For a while rumors abounded that Tandy (whose Color Computer already contains a Motorola chip set) would release a 64-color computer. They denied it all as usual. But you can tell. There's a prototype or two somewhere. . . .

Now at last for the reviews I promised last month. I've taken a look at two disk operating systems for the Color Computer. The first is ADOS from SpectroSystems. The second is Spectrum DOS 1.0 from Spectrum Projects. The products share many similarities, but I'll go over each one separately rather than comparing side by side.

Table 1. Features of ADOS.

- Repeat and edit of last direct-mode command.
- Control key abbreviated entry of Basic commands.
- Automatic line number prompts for program entry.
- Lowercase command entry.
- DOS command for booting OS9.
- One- or two-column directory, with free granules. (Screen or printer).
- COPY <filename> TO <drive number>.
- AE error override option for COPY and RENAME.
- RUNM command to load and execute a machine language program.
- RAM command for ROM-to-RAM transfer (64K access).
- SCAN command lists ASCII file to screen or printer. Gives start, end, and exec addresses for binary file.
- PRT ON/OFF enables/disables routing of text output to printer as well as screen.
- Mini-monitor provides hexadecimal memory examine and change capability.
- PEEP command provides movable window for viewing memory contents.
- High-resolution text screen driver included as an additional utility (42, 51, or 64 characters per line, with lowercase).
- Customizing utilities included enable definition of your own control key abbreviations, printer baud rate, disk step rate (6-30 ms), tracks per disk (35 or 40). Double sided drives supported.

ADOS

First, ADOS which describes itself as "an enhanced, ROM-able Disk Basic for the Radio Shack Color Computer, 64K required for RAM use." The statement about RAM use is interesting in itself. As the regular Tandy DOS is contained within the plug-in ROM cartridge at the side of the computer, there are two ways in which a new DOS can take over. The first involves switching to a memory map whereby 64K of RAM is addressed. This 64K contains the new DOS. The other way is to extract the ROM from the disk controller ROM pack and insert a different ROM containing the required DOS. So ADOS can be implemented either from RAM in 64K mode or from ROM if you have the ability to get an EPROM burned in. The ADOS manual gives addresses of two services that can do the EPROM programming for a mere $20 including the chip.

Brief descriptions of ADOS features are listed in Table 1.

Also included on the latest version of ADOS is an ERROR command which provides error trapping within Basic. The manual for ADOS consists of 11 pages of clearly written text which I

thought was OK. This isn't glossy magazine stuff. It is a concise description of the DOS commands and how to use them written for someone who already understands Tandy's DOS.

I liked the repeat-command feature. I wish all operating systems (disk or otherwise) had this facility. How often have you typed in a long command line only to have the computer throw it back at you for a single typo? ADOS lets you edit the last command line using the Basic line editor. Simply entering a slash brings up the entire last line input with the edit mode invoked. You simply correct any typos and press Enter. The command is then handed back to the computer as if you had retyped it. This is a nice feature.

I found the lowercase entry of commands to be another nice feature which worked well with my lowercase mode. I use Dennis Kitsz's lowerkit and constantly find myself in lowercase simply because it is less ugly than the Tandy inverse uppercase. Hence, the computer keeps complaining about syntax errors just because of the case I happpen to be in while typing. ADOS brings some sanity back to that scenario by happily working in either case.

For those of you who are still limping along in uppercase only, a high-resolution text screen utility is provided. This lets you choose 42, 51, or 64 characters per line. I wish 32 characters per line had been included so you could have a simulated low-resolution lowercase driver. However, this is only a bare-bones utility which doesn't react visibly to a CLS command or the Clear key.

The PRT ON/OFF command, which lets you concurrently send output to both screen and printer, is another goody. This is always useful. You can capture the printed output of an entire program without having to change all the PRINT statements to PRINT#-2 statements. The PRT ON option is apparently used when using the DIRP and CATP commands. DIRP sends the output of the DIR command to the printer and CATP sends the output of a CAT command to the printer. DIR is the same as the Tandy DIR command except that the number of free granules is printed at the end. CAT gives a two-column directory, letting you get more information on a single line. Using CATP gives a printed directory suitable for attaching to a disk envelope.

The reason I say that DIRP and CATP both invoke the PRT ON command is that if you hit Break during the output of the directory, you must type PRT OFF to disable the printed output. I don't like that. I think it is the responsibility of the operating system to deal with such situations.

A similar situation arises when the SCAN command is used. This lets you list the contents of an ASCII file or gives you the addresses involved with a machine code file. However, interrupting a file scan with the Break key requires a CLOSE command to be issued to avoid a subsequent AD error. This is only a minor problem, but it seems such a pity to allow the hard work involved in writing a DOS to be compromised by simple Break-key trapping. (Maybe previous Tandy Gram columns will help!)

The last thing I'll have room to discuss is the monitor command. Invoked with the MON command, this lets you examine and change memory in a manner similar to the ZBUG monitor that comes with the EDTASM+ assembler from Radio Shack. Many operating systems are equipped with facilities for debugging and this simple version makes up for the omission in Tandy's DOS.

Table 2. Spectrum DOS 1.0 commands.

DOS: Works like the one in 1.1 Disk Basic.
ERROR: This is ON ERROR GOTO.
FLEX: Boots Flex with ease.
RUNM: Loads and executes machine code programs.
PPEEK: 16-bit version of PEEK.
PPOKE: 16-bit version of POKE.
AUTO: Automatically issues line number prompts.
INVERT: Inverts subsequent output (lowercase).
NORMAL: Reverts output after INVERT command.
WAIT: Automatic timed pause command.
LMOVE: Copy and delete Basic lines.
RATE: Set drive(s) seek rate.
TRACKS: Sets the number of tracks per drive.
HELP: Lists all new commands.
HDIR: Hardcopy directory.
HIRES: Gives hi-res 32, 51, or 64 characters per line.
OLD: Undoes NEW command.
FKEY: Up to nine programmable keys.
LCOPY: Copy Basic line.
BREAK: Disables the Break key.
MEMO: Full screen editor and screen dump.
FLIP: Inverts the screen.
EXIT: Returns to normal text screen.
ECHO: Output to printer concurrently with screen.

Spectrum DOS 1.0

Next on the agenda is Spectrum DOS 1.0. This has many similarities to ADOS in that Radio Shack compatibility is maintained, some of the commands provide the same features (even using the same command names), and it, too, can be burned into an EPROM. Customizing utilities are also provided. The rundown of Spectrum DOS 1.0 commands is shown in Table 2.

First, a word about documentation. The manual is not a strong point, I'm afraid. I would never have dared turn anything like this over to my English teacher. Phrases like "bingo your in Spectrum DOS," "without the lose of your program," and "a inverse F" tend to lessen my confidence in any product no matter how high its apparent quality. Also, at a mere six pages, this DOS is ill served by its manual. A little more discussion of some of the commands would serve both to illustrate and encourage their use.

One thing I do like about this DOS is that it automatically searches all drives when looking for a program. I shouldn't even have to comment on a feature such as this which should be standard in any DOS whether it be for a Cray, a Color Computer, or a programmable calculator. Tandy was not thinking when they left it out. Spectrum DOS also lets you use any number of tracks on your drive so you can hook up an 80-track drive if you wish.

Along with other enhancements to life in the direct mode, DOS 1.0 lets you redefine both the cursor character and the READY prompt. A keyboard repeat feature is part of the package; to repeat a key, simply hold it down and the character shifts to second gear.

The high-resolution text screen is well integrated into the DOS. It doesn't feel like a separate software driver. The Clear key and the CLS command both work properly, and it is simple to revert back to normal low-resolution graphics with the NORMAL command. The Basic PRINT @ command is extended to work in any print density. However, no check is made for a PRINT @ where the character is off the screen, and I did manage to crash the DOS when I tried a PRINT CHR$(129) followed by EXIT to lo-res then LIST.

The LMOVE and LCOPY commands add a nice feature to Basic. Both commands allow you to copy Basic lines from one part of a program and place them in another. LMOVE deletes the old

lines, whereas LCOPY leaves them intact. Another nice command is OLD. Have you ever had that flash of panic when you typed in NEW and realized you hadn't saved the program first? Nasty isn't it? Salvation is at hand with the OLD command. As long as you don't add any line numbers after your NEW command, OLD will restore the program you absentmindedly erased.

The PRT ON/OFF command, which lets you concurrently send output to both screen and printer, is another goody.

Finally, I'll mention the HELP command. This is another command that should be available in any "real" DOS. Typing HELP brings to the screen a display of all the new commands along with the required syntax for their use.

Summary

Both of these disk operating systems have much more to offer than I have room to cover here. As for which one is better, I find it difficult to decide. Spectrum DOS 1.0 may have a slight edge, but I'm not comfortable with the thought that I could crash it so easily. ADOS stayed intact during my wild forays into its commands. A scan through the features of each DOS versus your own particular requirements will be your best guide.

The manual of Spectrum DOS 1.0 ends with a quaint quote which I can't resist passing on as an epilogue:

"Every precaution has been taken to assure that this program is error free, but there is no program in existence that it totally bug free. So if one is encountered please let us know." So folks, if you find a bug-free program. . . . ■

Firms Mentioned in This Column

SpectroSystems
11111 N. Kendall Dr., Suite A108
Miami, FL 33176
(305) 274-3899

Spectrum Projects
93-15 86th Dr.
P.O. Box 21272
Woodhaven, NY 11421
(718) 441-2807

POSTURE SUPPORT
THE BACK CHAIR
NOW ON SALE FROM $29.95

The First "Intelligent" Chair, FORMERLY $89.95! Now on sale from **$29.95. REDUCE THE EFFECT OF GRAVITY ON YOUR BACK.** Sitting regularly in a conventional chair your lower back is supporting the **TOTAL WEIGHT** of your body, plus additional weight due to the downward effect of gravity. Unfortunately most chairs are designed for appearance, not for comfort.

THE BACK CHAIR SOLUTION—Sitting on the Back Chair relieves your back from supporting the total weight of your body by distributing your weight between your lower back and legs. Your legs support you when standing, your lower back supports you when sitting. Combine them both in a comfortable sitting posture and you relieve the unnecessary stress on your back. When sitting on the Back Chair you'll feel more relaxed and sit up perfectly straight.

Standard Chair made of hardwood layers with final layer of Genuine Oak. Adjustable Chair made from solid hardwood with beautiful Oak Finish. Both come with **padded seat and knee pads** upholstered in Chocolate Brown. Dealer and Rep Inquiries Invited.

SHOP FASTER BY PHONE
1-805-966-7187

Or send a check or your credit card # (Diner's Club, VISA, MasterCard, American Express) for THE BACK CHAIR (Standard Model, $29.95 ea.; Adjustable Model, $49.95 ea.—please indicate below) plus $9.95 shipping (Canadian orders, $13.00 shipping). CA residents add 6% sales tax. Sorry no C.O.D. If not satisfied return within 15 days for refund (less shipping).

ITEM NO.	QUAN.	ITEM	PRICE EA.	SHIPPING	TOTAL
825		Stan. BACK CHAIR	$29.95		
808		Adj. BACK CHAIR	$49.95		

STARSHINE GROUP
816 B State Street, Dept. BC311, Santa Barbara, CA 93101
America's Premium Direct Mail House Now In Our 9th Year

CIRCLE 166 ON READER SERVICE CARD

The Power To Learn

...is in their hands with educational courseware from Opportunities for Learning. Only the best software meets our exacting standards, ensuring you of quality materials for your classroom or computer center. Write today for your free copy of the Selected Microcomputer Software catalog!

☐ ELEMENTARY EDITION ☐ SECONDARY EDITION

OPPORTUNITIES FOR LEARNING, INC.
20417 Nordhoff St., Dept. L108
Chatsworth, CA 91311
(818) 341-2535

Name _____
School _____
Address _____

CIRCLE 140 ON READER SERVICE CARD

IT ALL ADDS UP...

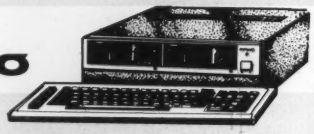
IBM SYSTEMS

Starting as low as

$1599

256K, 1-DS/DD DRIVE KEYBOARD

SANYO



MULTIFUNCTION CARDS

IDEA

IDEAmax - ZPR, 64K, C, S, P....$229.00
IDEAmini - YPR, C, S, P.....$189.00
IDEAminimax - MPR 128K...$229.00
IDEAshare Software.....$219.00

QUADRAM

Quadboard.....$229.00
Quadboard II.....$229.00
Expanded Quadboard.....$239.00
Quad 512+.....$249.00
Quad 2 Meg.....$879.00
Memory Board.....$229.00
QuadJr Exp. Chassis.....$539.00
QuadJr Exp. Memory.....$219.00
QuadMemJr.....$229.00
Chronograph.....$89.99
Parallel Card.....$69.99

AST

Six Pack Plus.....$239.00
Mega Plus II.....$269.00
I/O Plus II.....$139.00
Memory MBII.....$249.00
Advantage-AT.....$399.00

TECMAR

Captain - 64.....$239.00
Captain Jr. 128K.....$339.00

PARADISE

Five Pack - C, S, P.....$189.00

VIDEO CARDS

Amdek - MAI.....$249.00
AST - Preview Monograph.....$299.00
Graph Pak Mono/64K...$599.00
MonoGraph Plus.....$399.00
Hercules - Graphics.....$349.00
Color.....$199.00
Paradise - Modular Graphics.$319.00
Multi-Display.....$299.00
Eagle - Color.....$199.00
Quadram - Quadcolor I.....$219.00
Quadgraph.....$379.00

MAINFRAME

AST 5251/11.....CALL
5251.....$579.00
3780.....$639.00
BSC.....$499.00
DCA IRMA 3270.....$899.00

KEYBOARDS

Keytronics Keyboards 5150, 5151, 5151 Jr, 5149 Jr....CALL

MEMORY CHIPS

4164 RAM Chips.....ea. $2.99

HARD DRIVES

Alloy.....CALL
IDEAssociates - 5, 10, 15, 20, 25, 40 and 45 meg.....from $1299.00
Iomega 10, 20 meg.....from $2149.00
TallGrass 20,30,80 meg from $2699.00
Tandon 5¼" 320K Floppy... $139.00

SOFTWARE

LOTUS

Symphony.....$449.00
1-2-3.....$309.00

Hayes

Please (Data Base).....$239.00

PEACHTREE SOFTWARE

PeachPack (GL/AP/AR).....$219.00

MICROPRO

WordStar 2000.....$279.00

MICROMIM

R:Base 4000.....$279.00

MULTIMATE INT.

Multi Mate.....$269.00

MICROSTUF

Crosstalk.....$99.99

MICROSOFT

Flight Simulator.....$39.99
MultiPlan.....$139.00

ASHTON-TATE

Framework.....$349.00
dBASE II.....$299.00
dBASE III.....$389.00
dBASE II.....upgrade.....$139.00
Friday!.....$179.00

PROFESSIONAL SOFTWARE

PC Plus/The Boss.....$269.00

SYNAPSE

File Manager.....$59.99

ELECTRONIC ARTS

Get Organized.....$79.99
Cut -n- Paste.....$39.99
Music Construction.....$29.99
One -on- One.....$29.99
Financial Cookbook.....$34.99

ALPHA SOFTWARE

Electronic Desk.....$219.00

BORLAND

Turbo Pascal.....$39.99
Sidekick.....$39.99

SPI

Open Access.....$399.00

HARVARD SOFTWARE INC.

Harvard Project Manager.....$229.00

PFS
IBM/APPLE

Access (NEW).....$89.99
Write.....$89.99
Graph.....$89.99
Report.....$79.99
File.....$89.99
Plan.....$89.99

HUMAN EDGE SOFTWARE

Communication Edge.....$129.00
Management Edge.....$165.00
Negotiation Edge.....$195.00
Sales Edge.....$165.00

PC COMPATIBLES

ZENITH

PC-150 Desktop.....CALL
PC-160 Portable.....CALL

COLUMBIA

Desktops.....CALL
Portables.....CALL

SANYO

MBC 550.....$639.00
MBC 550-2.....$749.00
MBC 555.....$879.00
MBC 555-2.....$1099.00
MBC 775 Portable.....CALL

CORONA

Desktops.....CALL
Portables.....CALL

APPLE

APPLE IIe PROFESSIONAL PACK
64K Apple IIe, Dual Disk Drive & Controller, Extended 80 Column Card, Monitor II & DOS 3.3.....CALL

APPLE IIe.....CALL
APPLE IIc.....CALL
MacINTOSH.....CALL
IIc LCD Display.....CALL

MONITORS

AMDEK

300 Green.....$129.00
300 Amber.....$149.00
300 Color/Audio.....$259.00
310 Amber IBM-Plug.....$169.00
Color 500 Composite/RGB/VCR.$389.00
Color 600 Hi-Res (640 × 240).$439.00
Color 700 Hi-Res (720 × 240).$499.00
Color 710 Long Phosphor.....$579.00

BMC

1201 Plus (12" Green Hi-Res).$88.99
9191U Color.....$209.00
9191 Color Plus.....$229.00

NAP

12" Amber.....$69.99

NEC

JB 1260 Green.....$99.99
JB 1201 Green.....$139.00
JB 1205 Amber.....$149.00
JB 1215 Color.....$229.00
JC 1216 RGB.....$379.00
JC 1460 Color.....$269.00

PRINCETON GRAPHICS

MAX-12 Amber.....$199.00
HX-12 RGB.....$489.00
SR-12 RGB.....$629.00

SAKATA

SC-100 Color.....$249.00
SG-1000 Green.....$129.00
SA-1000 Amber.....$139.00

TAXAN

115 12" Green Mono.....$99.99
116 12" Amber Mono.....$99.99
121 Green TTL.....$149.00
122 Amber TTL.....$169.00
210 Color RGB.....$239.00
400 Med-Res RGB.....$319.00
415 Hi-Res RGB.....$439.00
420 Hi-Res RGB (IBM).....$429.00
440 Ultra Hi-Res RGB.....$649.00

QUADRAM

8400 Quadchrome.....$489.00
8410 Quadchrome II.....$479.00
8420 Amberchrome.....$199.00

ZENITH

ZVM 122 Amber.....$84.99
ZVM 123 Green.....$84.99
ZVM 124-IBM Amber.....$149.00
ZVM 131 Color.....$309.00
ZVM 133 RGB.....$429.00
ZVM 135-RGB/Color.....$459.00
ZVM 136-RGB/Color.....$629.00

MODEMS

ANCHOR

Volksmodem.....$59.99
Volksmodem XII.....$189.99
Mark IL Serial.....$79.99
Mark VII (Auto Ans/Auto Dial)$99.99
Mark XII (1200 Baud).....$259.00

Hayes

Smartmodem 300.....$199.00
Smartmodem 1200.....$419.00
Smartmodem 1200B.....$389.00
Smartmodem 2400.....$699.00
Micromodem IIe.....$269.00
Micromodem 100.....$149.00
Smart Com II.....$89.99
Chronograph.....$199.00

AST

Reach 1200 Baud Half Card..$399.00

Novation

Smart Cat Plus.....$329.00
J-Cat.....$99.99
Smart Cat 103.....$179.00
Smart Cat 103/212.....$399.00
AutoCat.....$219.00
212 AutoCat.....$549.00
Apple Cat II.....$249.00
212 Apple Cat.....$449.00
Apple Cat 212 Upgrade.....$259.00

ZENITH

ZT-1.....$339.00
ZT-10.....$309.00
ZT-11.....$369.00

COMPUTER MAIL ORDER

VISA MasterCard AMERICAN EXPRESS DINERS CLUB

TOLL FREE ORDER LINE **1-800-233-8950**
In PA Call: (717) 327-9575

WEST
P.O. Box 6689, **Dept. A304**
Stateline, NV 89449

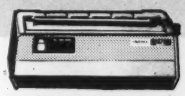
EAST
477 E. 3rd St., **Dept. A304**
Williamsport, PA 17701

Order Status Number: (717) 327-9576
Customer Service Number: (717) 327-1450

CANADIAN ORDERS
Ontario/Quebec: **1-800-268-3974**
Other Provinces: **1-800-268-4559**
In Toronto: (416) 828-0866 Telex: 06-218960
2505 Dunwin Drive, Unit 3
Mississauga, Ontario, Canada L5L1T1

Open purchase orders accepted with net 30 days terms, subject to credit approval. Next day shipping on all stock items. No risk, no deposit on C.O.D. orders and no waiting period for certified checks or money orders. Add 3% (minimum $5) shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. Call today for our catalog.

...THE BEST PRICES



PRINTERS

AXIOM
AT-100 Atari Interface Printer $159.00
AT-850 Atari Dual Mode $259.00
GP-100 Parallel Interface $189.00
GP-700 Atari Color Printer $489.00
GP-550 Parallel Printer $269.00

BMC
401 Letter Quality $589.00
BX-80 Dot Matrix $229.00

CITIZEN
MSP-10 (80 col) $349.00
MSP-15 (132 col) $539.00

C.ITOH
Prowriter 7500 $269.00
Prowriter 8510P $339.00
Prowriter 1550P $569.00
Son of Starwriter A10P $479.00
Hot Dot Matrix CALL
F10-40P Starwriter $949.00
F10-55 Printmaster $1099.00

COMREX
ComWriterII Letter Quality $399.00

DIABLO
620 Letter Quality $749.00
630 API Letter Quality $1549.00

DAISYWRITER
2000 $949.00

EPSON
RX-80, RX-80FT+, RX-100 CALL
FX-80+, FX-100+, LX-80 CALL
LQ 1500, JX80 Color CALL

JUKI
6100 $439.00
6300 $749.00

MANNESMAN TALLY
Spirit 80 $239.00
160L $569.00
180L $699.00

NEC
8027 Transportable $329.00
2010/15/30 $719.00
2050 IBM $639.00
3510/15/30 $1299.00
3550 IBM $1399.00
8810/15/30 $1699.00
8850 IBM $1749.00

OKIDATA
82, 83, 84, 92, 93, 180, 2350, 2410, Okimate-20 CALL
Okimate-64 $199.00
Okimate - Atari $199.00

OLYMPIA
Needlepoint Dot Matrix $339.00
Compact RO $399.00
Compact 2 $439.00

PANASONIC
KX1090 $219.00
KX1091 $299.00
KX1092 $449.00
KX1093 $639.00

QUADRAM
Quadjet $749.00

SILVER REED
400 Letter Quality $279.00
500 Letter Quality $329.00
550 Letter Quality $459.00
770 Letter Quality $799.00

STAR MICRONICS
SG10 (120 cps) $249.00
SG15 (120 cps) $419.00
SD10 (160 cps) $379.00
SD15 (160 cps) $499.00
SR10 (200 cps) $529.00
SR15 (200 cps) $669.00
Powertype $329.00

TOSHIBA
1340 $769.00
1351 $1349.00

INTERFACES

PRACTICAL PERIPHERALS
Graphcard $84.99
Serial Card $109.00
Microbuffer II+ $179.00
Microbuffer 32K $199.00

QUADRAM
Microfazer - from $139.00
Efazer (Epson) from $79.99

MICROBITS
MB1150 (Atari) $79.99

HEWLETT PACKARD
41CV $189.99
41CX $249.99
HP 71B $419.99
HP 11C $62.99
HP 12C $89.99
HP 15C $89.99
HP 16C $89.99
HP 75D $999.99
HPIL Module $98.99
HPIL Cassette or Printer $359.99
Card Reader $143.99
Extended Function Module $63.99
Time Module $63.99
We stock the full line of HP calculator products

ORANGE MICRO
Grappler CD (C64) $99.99
Grappler + (Apple) $109.00
Grappler 16K+ (Apple) $189.00

DIGITAL DEVICES
Ape Face (Atari) $49.99
Uprint (Atari) $59.99
Uprint (C-64) $59.99
Printer Buffer P-16 $79.99

NEC
PC-8401 CALL
PC-8201 Portable Computer $299.00
PC-8231 Disk Drive $619.00
PC-8221A Thermal Printers $149.00
PC-8281A Data Recorder $99.99
PC-8201-06 8K RAM Chips $105.00

SHARP
PC-1350 $159.99
PC-1261 $159.99
PC-1260 $109.99
PC-1500A $165.99
PC-1250A $88.99
CE-125 Printer/Cassette $128.99
CE-150 Color Printer Cassette $171.99
CE-161 16K RAM $134.99

ATARI HOME COMPUTERS

NEW 65XE (64K)
130XE (128K)
130ST (128K)
520ST (512K)
CALL FOR PRICING

600XL & 800XL CALL WHILE SUPPLIES LAST

850 Interface $109.00
1010 Recorder $49.99
1020 Color Printer $79.99
1025 Dot Matrix Printer $199.99
1027 Letter Quality Printer $269.99
1030 Direct Connect Modem $69.99
1050 Disk Drive $179.99
Touch Tablet $64.99
7097 Atari Logo $74.99
4018 Pilot (Home) $57.99
5049 VisiCalc $59.99
CX30 Paddles $11.99
CX40 Joystick $7.99
4011 Star Raiders $12.99
4022 PacMan $16.99
4025 Defender $32.99
8026 Dig Dug $32.99
8031 Donkey Kong $32.99
8034 Pole Position $32.99
8043 Ms PacMan 32.99
8044 Joust $32.99
8052 Moon Patrol $32.99

MEMORY BOARDS

Axlon 32K $39.99
Axlon 48K $69.99
Axlon 128K $269.99
Microbits 64K (600) $109.00

SWP
ATR-8000-16K Z80 CPM $349.00
ATR-8000-64K Z80 CPM $499.00

BIT 3
Full View 80 $239.00

DISK DRIVES

INDUS
GT Drive (Atari) $259.00

RANA
Rana 1000 $199.00

MODEMS

Micro Bits MB-1100 $129.99

COMMODORE

NEW Commodore 128, LCD CALL

CBM 8032 $639.00
CBM 4032 $599.00
CBM 9000 $999.00
2031 LP Disk Drive $299.00
8050 Disk Drive $999.00
8250 Disk Drive $1249.00
4023 Printer $329.00
8023 Printer $589.00
6400 Printer $1349.00
Z-RAM $299.00
Silicon Office $299.00

PROFESSIONAL SOFTWARE
Word Pro 4 Plus/5 Plus each $239.00
Info Pro $179.00
Administrator $399.00
Power $69.99

MSD
SD1 Disk Drive $299.00
SD2 Disk Drive $529.00

INDUS
Indus GT/C64 $269.00

SX-64 Portable $499.00
Commodore Plus 4 $199.00
CBM 64 $149.00
C1541 Disk Drive $199.00
C1530 Datasette $39.99
M-801 Dot Matrix Printer $189.00
M-802 Dot Matrix/Serial $219.00
MCS 803 Dot Matrix $179.00
C1802 Color Monitor $199.00
C1660 Auto Modem $89.99
DPS 1101 Daisy Printer $339.00

PROFESSIONAL SOFTWARE
Fleet System II w/Spell $59.99

PFS
File (64) $59.99
Report (64) $59.99

PRECISION SOFTWARE
Superbase 64 $59.99
BATTERIES INCLUDED
PaperClip w/Spell Pack $84.99
The Consultant DBMS $89.99
Bus Card II $149.00
80 Col Display $149.00

PERSONAL PERIPHERALS
Super Sketch Graphics Pad $39.99

DISKETTES

maxell
5¼" MD-1 $18.99
5¼" MD-2 $28.99
8" FD-1 $39.99
8" FD-2 $49.99

VERBATIM
5¾" SS/DD $21.99
5¼" DS/DD $29.99

BIB
5¼" Disk Head Cleaner $14.99

Dennison
Elephant 5¼" SS/SD $14.99
Elephant 5¼" SS/DD $16.99
Elephant 5¼" DS/DD $20.99
Elephant EMSP 5¼ $29.99

DISK HOLDERS
INNOVATIVE CONCEPTS
Flip-in-File 10 $3.99
Flip-in-File 50 $17.99
Flip-in-File 50 w/lock $24.99
Flip-in-File (400/800 ROM) $17.99

VISA
MasterCard

COMPUTER MAIL ORDER

AMERICAN EXPRESS
DINERS CLUB

TOLL FREE ORDER LINE **1-800-233-8950**
In PA Call: (717) 327-9575

WEST
P.O. Box 6689, **Dept. A304**
Stateline, NV 89449

EAST
477 E. 3rd St., **Dept. A304**
Williamsport, PA 17701

Order Status Number: (717) 327-9676
Customer Service Number: (717) 327-1450

CANADIAN ORDERS
Ontario/Quebec: **1-800-268-3974**
Other Provinces: **1-800-268-4559**
In Toronto: (416) 828-0866 Telex: 06-218960
2505 Dunwin Drive, Unit 3
Mississauga, Ontario, Canada L5L1T1

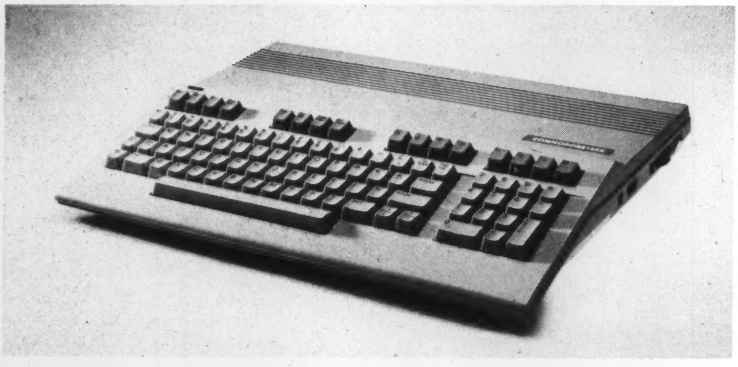
CANADIAN ORDERS: All prices are subject to shipping, tax and currency fluctuations. Call for exact pricing in Canada. INTERNATIONAL ORDERS: All orders placed with U.S. offices for delivery outside the Continental United States must be pre-paid by certified check only. Include 3% (minimum $5) shipping and handling. EDUCATIONAL DISCOUNTS: Additional discounts are available to qualified Educational Institutions. APO & FPO: Add 3% (minimum $5) shipping and handling.

CIRCLE 107 ON READER SERVICE CARD

COMMODORE'S PORT

The Commodore 128 PC

Sheldon Leemon



The new Commodore 128 is a powerful upgrade of the highly successful Commodore 64. In it's attempt to serve the broad range of needs found among users of low-end personal computers, Commodore has actually created three computers in one. The 128 has all of the features of the 64 and can emulate it exactly. In addition, it has a 128K super-64 mode, with over 119K of RAM accessible to Basic programmers, a new Basic interpreter that fully supports the machine's sound and graphics capabilities, an extended keyboard, and an 80-column color or monochrome display capability built in. Finally, there is a separate Z80 processor, which allows the use of standard CP/M software (the machine comes equipped with CP/M Plus Version 3.0). This new machine also improves the slow disk drive access time that plagued the 64, and made it less than satisfactory for business use. When used with the new 1571 disk drive, the 128 will perform Commodore-style disk I/O five times faster than the 64, and is over ten times faster in CP/M mode.

Physically, the 128 is a sleek machine with a low profile and an attractive, dramatically styled white case. It is a little wider than the 64, not quite as high, and almost twice as deep. The backplane extends so far back beyond the keyboard that it is almost possible to stand a monitor on it. The core of the new keyboard is a 66-key duplicate of the 64 keyboard. Off to the right side is a 14-key numeric pad, and along the top row are groupings of new keys, including separate cursor, ESC, TAB, ALT, CAPS LOCK, HELP, LINE FEED, 40/80 DISPLAY, and NO SCROLL keys. On the right side of the unit are two joystick ports, the on/off switch, and a reset button. The port connectors on the back of the unit are identical to those on the 64, with the addition of a second video output, to be used for the new 80-column display to either an RGBI or high-resolution monochrome monitor.

To get an idea of the capabilities of this new machine, let's examine its three modes. First is the Commodore 64 mode. Since by this time the features of the 64 are fairly well known, there is no need to go into much detail here except to say that when the 128 is in 64 mode, the machine is 100% compatible with the 64. How compatible is it? So compatible that you can't even switch back to 128 mode without turning the computer off, since when in 64 mode it has no access whatever to the memory management chip (which of course is not present on a real 64). So compatible that when in 64 mode the computer cannot read the additional keyboard keys.

Compatibility may be reduced somewhat when the machine is used with the new 1571 drives. Though the drive behaves as closely as possible to a 1541, there may be slight differences that will confuse some of the more exotic copy protection schemes. Commodore has stated that it will help manufacturers cure even these rare cases of disk incompatibility. In short, unless a program is doing something incredibly bizarre, it will load, and if it loads, it will certainly run.

Next, we move on to 128 mode. This is the mode in which we find the machine on power up. The first thing you see is a message telling you that Basic version 7.0 has 122365 bytes free. In this mode, all of the features of the 64 are retained, but there are several new features as well. First of all, in this mode the entire extended keyboard is operative, and since the key assignment table is stored in RAM, any or all of the keys can be redefined. The C128 has a greatly expanded 48K ROM Operating System (three times as big as that of the 64). Of this, approximately 16K consists of the Kernal Input/Output and advanced screen editor routines, and 32K is devoted to the Basic language and a full machine language monitor. Many of the new features are very similar to those found in the ill-fated Plus/4 and the B128, such as an advanced screen editor (which includes such features as line insertion, line deletion, and margins at the top, bottom, and sides of the screen).

The Basic interpreter, version 7.0, has all of the features of every previous Commodore Basic and then some. It features the full range of disk commands supported by Basic 4.0 found on the CBM business computers and all of the music, hi-res, and sprite graphics commands found in the Super Expander car-

tridge. To these, it adds a number of miscellaneous commands from Basic 3.5 on the Plus/4, including Basic utilities such as automatic line numbering, renumbering, and block deletion, a powerful PRINT USING command for formatting output, and some structured programming constructs, such as BEGIN, BEND, DO, LOOP, WHILE, UNTIL, and EXIT.

In at least one respect, however, the C128 differs from every previous Commodore machine. Upon power-up, the computer checks the disk drive to see if it contains a special auto-booting disk. If it does, it will load and run the program (either a named file or a range of sectors of the disk) that is indicated in the boot sector of the disk. This feature, previously found on almost every other home computer, allows the creation of applications programs that can be easily used by those unfamiliar with the operation of a computer. Similarly, the Basic command RUN has been changed so that the command RUN "PROGRAM" will load and automatically run the named program.

One hardware difference between the 128 and the 64 is the memory management chip that enables switching between the various modes of operation. It also allows the use of 128K of RAM and up to 112K of ROM memory by a microprocessor that can access only 64K at a time. In fact, the memory management system can handle up to 512K of RAM, although the extra 384K can be used only as a super-fast RAM disk. Such a RAM disk add-on unit was hinted at by Commodore officials, though they made no actual product announcement.

Unlike a simple bank selection process that allows the software to flip between two banks of 64K at a time, the new chip allows you to do such things as select common areas of memory that will be shared by the different memory banks. The memory management chip also allows you to designate more than one color RAM area. This makes it easier to keep multiple screens of display data in memory and flip from screen to screen.

Machine language programmers will appreciate the fact that this chip will allow them to set up multiple zero page and stack segments. In addition to the built-in ROM and RAM, the memory management allows up to two 32K application programs in ROM. Such ROM programs can be added as special 128 cartridges. These cartridges operate like the Plus/4 "function key" cartridges. On power-up, the computer checks to see if any such cartridges are present, and if any are, they can take control briefly and hook themselves up to one of the function keys, which can then be used to start the cartridge program.

The engineers demonstrating the new computer at the Consumer Electronics Show in Las Vegas said that the machine also has an empty IC socket that could be filled with up to 32K of application program or system ROM, making that application or system program available to the user on power-up. Proposed uses for that ROM space include advanced DOS support, drivers for a mouse controller, and RAM disk software to support proposed memory extension modules. As of this writing, the question of what ROM will be added is not yet settled, but it seems fairly certain that some little "goodie" will be thrown in.

In addition to the 40-column VIC display chip found on the 64, the C128 has an entirely separate 80-column display controller chip, similar to the one used by the IBM PC. This chip provides output for a full 80-column RGBI 16-color display with 640 x 200 resolution. This display can also be viewed on a high-resolution monochrome monitor. Since the 40-column and 80-column display systems are completely separate, it is quite possible for a program to generate two completely different displays at once.

Or, it is possible to shut off the VIC chip completely, and only use the 80 column display. When this is done, the clock speed of the system is doubled to 2 MHz, because unlike the VIC chip, the new CRT controller does not share RAM with the processor. It has its own 16K of memory, which the processor can access only via the video chip. All of the text characters on the 80-column screen are in effect bit-mapped, using a standard character set that is downloaded to its screen memory. Since the character data are in RAM, an unlimited variety of user-defined characters can be downloaded and displayed on the 80-column screen. This makes it possible to display high-resolution graphics in a 640 x 200 format, as well as text. The major limitation is speed since the main processor cannot read display memory directly, but must go through the display controller chip. While this probably lets out hi-res animation, quality business graphics are perfectly feasible.

There are two other minor, albeit very useful hardware additions to the Plus/4. The first is a Reset button located on the right side of the case next to the on/off switch. This allows you to recover from a software crash without disturbing the contents of memory. The other change is to the serial port, which is now connected to the CIA chip hardware serial register. This means that while the disk drive still uses a serial, rather than a faster parallel connection, at least the C128 does not have to rely on slow software handshaking for its serial transfer. The older 1541 disk drive can still be used with the 128, but the computer cannot make use of the faster transfer rate when connected to it.

If these were the only additional features that the C128 had to distinguish it from the 64, it would still be a distinct step up. But on top of all of these new features, the 128 is a complete CP/M machine. Using a Z80A microprocessor, the 128 runs CP/M Plus Version 3.0, which is supplied with the computer. The clock speed of the Z80 is given as 4 MHz, but the engineers state that the effective speed of the system is probably closer to 2 MHz. Although the 80-column display is more in keeping with the requirements of most CP/M programs, the Z80 also has control of the VIC chip with its colorful sprite graphics, and the musical capabilities of the SID chip.

The system boots CP/M from a Commodore formatted disk, but once activated it can use the 1571 disk drive to load programs and read data in standard IBM System 34 format (used by computers like the Kaypro and Osborne). Under software control, the drive can also emulate other CP/M formats. In CP/M mode, the 1571 drive stores up to 410K of data and has a transfer rate almost 12 times as fast as the 64 drive. Thus, the machine provides access to the entire CP/M software library, without requiring you to convert the software to any particular disk format.

With the C128, Commodore seems to have addressed all of the deficiencies of the 64 that might have disqualified that machine as a serious, general purpose computer. A faster disk drive with greater storage capacity has been added, and an 80-column display provided. To the already massive home software library of the 64, this machine adds the enormous CP/M library, which features time-tested software for every type of business application. Thus, in its versatility this machine rivals, and perhaps surpasses the Apple II, at a price very close to the current level of the 64. ■

Lyco Computer Marketing & Consultants

TOLL FREE 800-233-8760

apple

Scarborough

Songwriter	$24.75
Picturewrit	$24.75
Phi Beta F	$32.75
Mastertype	$24.75
Run f Money	$32.75
Net Worth	$54.75

Microprose

Solo Flight	$22.75
NATO	$22.75
Spitfire	$22.95
F-15 Strike	$22.75
Air Rescue	$22.75

SSI

Baseball	$22.75
Questron	$26.75
Germany 1985	$32.75
50 Missions	$21.75

Spinnaker

Alphabet	$18.75
Story Machine	$19.75
Kids on Keys	$18.75
Grandma	$19.75
Snooper Troop	$22.75

Broderbund

Bank St. Writer	$42.75
Bank St. Filer	$42.75
Bank St. Mailer	$42.75
Bank St. Spell	$42.75
Mask of Sun	$24.95
Print shop	32.95
Lode Runner	$22.95

Graphics Tablet

Supersketch	$49.95
Kolala	$84.95

ATARI

800XL COMPUTER	CALL
1050 DRIVE	CALL
1010 RECORDER	$55.00
1020 PRINTER	$59.00
1025 PRINTER	$189.00
1027 PRINTER	$249.00
1030 MODEM	$59.00
MONKEYWRENCH II	$52.75
HOME ACCOUNT D	$44.75
TAX ADVANTAGE	$35.75

SUB LOGIC

Flight Simulator II C-64	32.75
Flight Simulator II Atari	32.75
Flight Simulator II Apple	32.75

Trillium

Shadowkeep	$26.75
Fahrenheit 451	$26.75
Amazon	$26.75

Synapse

Synfile	$48.95
Syncalc	$48.95
Syncomm	$29.95
Syntrend	$48.95

Graphics Tablet

Supersketch	$32.95
Kolala	$69.95
THE ILLUSTRATOR	$99.95
SPIDER EATER	$22.50
SPEEICOPTER	$27.75

BUSINESS

VISICALC	$159.75
LETTER PERFECT R	59.00
DATA PERFECT	$89.75
FILE MANAGER	$69.75
HOME FILE MGR	$69.75

DEADLINE	$34.75
ENCHANTER	$34.75
INFIDEL	$34.75
PLANETFALL	$34.75
STAR CROSS	$34.75
SUSPENDED	$34.75
WITNESS	$34.75
ZORK I	$26.75
ZORK II	$26.75

Scarborough

Songwriter	$24.75
Net Worth	$49.95
Mastertype	$24.75
Run f Money	$24.75

Microprose

Solo Flight	$22.75
NATO	$22.75
Spitfire	$19.95
F-15 Strike	$22.75
Air Rescue	$22.75

SSI

Baseball	$22.75
Questron	$26.75
50 Missions	$21.75

Spinnaker

Alphabet	$18.75
Story Machine	$21.75
Kids on Keys	$18.75
Grandma	$19.75
Snooper Troop	$22.75

Broderbund

Bank St. Writer	$42.75
Spellmaker	$19.95
Mask of Sun	$24.95
Choplifter	$22.95
Lode Runner	$22.95

COMMODORE

COMMODORE

C64 COMPUTER	CALL
SX 64 COMPUTER	CALL
C1541 DISK DRIVE	$239.00
C1526 PRINTER	$269.00
MPS801 PRINTER	$215.00
C1702 MONITOR	$249.00
C64105 LOGO 64	$45.00
C64106 PILOT 64	$35.00
SIMON'S BASIC	$29.00

SSI

Baseball	$22.75
Germany 1984	$32.75
50 Missions	$21.75

PERSONAL PERIPHEIALS

Super Sketch-Atari	32.95
Super Sketch-C-64	37.95
Super Sketch-TI99/4A	37.95
Super Sketch-Apple	52.95
Super Sketch-IBM PC	52.95

Timeworks

Inventory	$32.75
Sales	$32.75
Accts. Rec	$32.75
Accts. Rec	$32.75
G. Ledger	$39.75
Data Mgr	$14.75
Checkbook	$14.75
Star Battle	$14.75
Cave of Word	$18.75

CARDCO

C/01 Write Now	29.95
C/02 Write Now - 64	39.95
D/01 Mail Now - 64	29.00
D/04 Spell Now - 64	29.00
D/02 Utility Desk	19.95
CSD-1 Disk Drive (new)	CALL

MOD-1 Modern (new)	CALL
D/03 Tax Payer (new)	27.95
D/07 Calc Now/64 (new)	27.95
D/08 SUper Printer Utility	
D/08 Super Printer Utility	27.95
CK/1 Numeric Key Pad	34.95
DC/1 Data Cassette	39.95
CB/5 5 Slot Board C-64	54.00
CR/1 Light Pen	29.75
CE/1 Cassette Interface	29.75
CB/3 3 Slot Board Vic-20	24.95
CB/6 6 Slot Board Vic-20	65.00

Scarborough

Songwriter	$24.75
Phi Beta F	$29.95
Mastertype	$24.75
Run f Money	$24.75
Net Worth	$49.95

Batteries Included

Paper Clip	$59.95
Spell Pak	$34.95
Consultant	$64.95
Paper Clip with Spell Pak	$79.95
Home Pak	$34.95
BUS CARD	$139.95
80 Column Board	$109.95

Microprose

Solo Flight	$22.75
NATO	$22.75
Spitfire	$19.95
F-15 Strike	$22.75
Air Rescue	$22.75

ADVENTURE

Diskey	32.95
Ultra Disassembler	32.95

HES

HES Games 64	22.95
Omni Writer/Spell	34.95
HES Mon 64	23.95
Microsoft Multiplan	55.00
Type N Write	19.95
Turtle Graphics II	23.95
Cell Defense	22.95
Paint Brush	12.95
Tri Math	22.95
Graphics Basic	27.95
HES Kit	29.95
Millionaire	23.95
64 Forth	24.95
HES Writer 64	24.95

MONITORS

TAXAN

210 Color RGB	255
100 Green	115
105 Amber	125
400 Color RGB	295
410 Color RGB	349
420 Color IBM	449
121 Green IBM	145
122 Amber IBM	149

ZENITH

ZVM 122A Amber	86
ZVM 1236 Green	82
ZVM 124 Amber - IBM	129
ZVM 131 Color	275
ZVM 133 RGB	389
ZVM 135 Composite	449
ZVM 136 Hi Res Color	589

GORILLA

12 Green	$ 82.00
12 Amber	$ 88.00

AMDEK

300 Green	125
300 Amber	145
310 Amber - IBM	159
Color 300-Audio	265
Color 500-Composite	379
Color 600	545
Color 700	635
Color 710	675

NEC

JB 1260 Green	99.00
JB 1201 Green	135.00
JB 1205 Amber	145.00
JC 1215 Color	255.00
JC 1216 RGB	399.00
JC 460 Color	349.00

SAKATA

SC-100 Color	229
STSI Tinstand	29
SG 1000 Green	99
SA 1000 Amber	109

MODEMS

MICROBITS

MPP1000C	$109.00

NOVATION

J-Cat	$89.00
Cat	$129.00
Smart Cat 103/	$169.00
Smart Cat 103/212	$389.00
AutoCat	$209.00
212 Auto Cat	$539.00
Apple Cat II	$239.00
212 Apple Cat	$439.00
Apple Cat 212 (Upgrade)	$249.00
Smart Cat Plus	$359.00

Hayes

Smartmodem 300	$199.00
Smartmodem 1200	$469.00
Smartmodem 1200b	$399.00
Micromodem IIe	$249.00
Micromodem 100	$289.00
Chronograph	$179.00

ANCHOR

Volksmodem	$55.99
Mark VII (auto ans/dial)	$95.99
Mark VII (1200 baud)	$259.00

TELELEARNING

CM-250 Commodore 64	CALL
AP-250 Apple	CALL
113-250 IBM	CALL

Westridge C-64 ... Call
Total Telecommunications C-64 ... Call
Mitey Mo C-64 ... Call

AMERICA'S MAIL ORDER HEADQUARTERS

LYCO COMPUTER

WORLD'S LEADER IN SALES & SERVICE

TO ORDER
CALL TOLL FREE
800-233-8760
In PA 1 717-327-1824
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740

Lyco Computer Marketing & Consultants

"PEOPLE WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT RECEIVE THE LOWEST PRICES AT LYCO"

SAVE ON THESE IN-STOCK PRINTERS

GEMINI 10X
$219 ★

MANNESMANN TALLY
SPIRIT 80 ..... $255.00
MTL-160L $549.00
MTL-180L $739.00

JUKI
Juki 6100 ..... $389
Tractor Kit $119

Epson
RX80 ..... $229
RX80FT $269
RX100 ..... $369
FX80 ..... $369
FX100 ..... $555
JX80 ..... $1089
LQ1500P(includes kit) ... $1149
LQ1500S(includes kit) ... $529

Citoh
Prowriter8510A $269
8510BC2 ..... $399
8510BP1 ..... $349
8510SP $399
8510SR $409
8510SCP $419
8510SCR $499
1550P $489
1550BCD $539
A10-20P $469
F1040PU or RDU $899
F1055PU or RUD $1099

DIGITAL DEVICES
16K printer buffer 99.75
32K printer buffer 119.75
64K printer buffer 169.95

BLUE CHIPS
M12010 ..... $275
M12010 C-64 ..... $275
D4015 ..... $1389

OKIDATA
Okimate 10 ..... CALL
82A $229
83A $549
84 ..... $649
92 ..... $349
93 ..... $569

LEGEND
880 ..... $229.00
1000 ..... $279
1200 ..... CALL
1500 ..... CALL
1081 ..... CALL

CARDCO
LQ1 Printer 379.00
LQ3 Printer 299.00
C/?6 C-64 Graphics 65.75
C/?B C-64 ..... 39.75
C/?AT Atari 55.00

Smith Corona
Fastext 80 ..... 189.00
D100 ..... 219.00
D200 ..... 399.00
D300 ..... 519.00
L1000 ..... 339.00

Corona
LP300 Laser Printer ..... 2699.
200361 Toner Cartridge ... 89.

NEC
NEC 8025 ..... $699
NEC 8027 ..... $359

STAR MICRONICS
Gemini 10x $219
Gemini 15x $345
Delta 10 ..... $339
Delta 15 ..... $449
Radix 10 ..... $499
Radix 15 ..... $589
Powertype $309
Sweet P 100 ..... $549

PANASONIC
1090 ..... $219
1091 ..... $259
1092 ..... $415
1093 ..... $599
3151 ..... $469

PANASONIC 1091 $259

NOW STOCKING CITIZEN & OLIVETTIC PRINTERS

OVER 2000 SOFTWARE TITLES IN STOCK

COMPUTER CARE

BIB
DISK DRIVE CLEANER $12.75
COMPUTER CARE KIT ... $19.75

NORTRONICS DISK DRIVE CLEANER with software for IBM-PC, Atari, Vic,
DISK DRIVE CLEANER with software for IBM-PC, Atari, Vic, Apple, TI $29.75
DISK CLEANER REFILL $14.75
CASSDRIVE CLEANER ... $9.95
MEDIA BULK ERASER ... $46.75

NEC
PC8201 Portable $429
NECB1 64K Computer System $1049
NECB2 128 K Computer System $1299
PC8221 Thermal Printer ... $ 139
PC8201 8K RAM Chip ... $ 99
PC8206 32K RAM Cart ... $ 299
PC300 Modem ... $ 65
PC8801 MSDOS 16 Bit Card ... $ 339

PRINTING PAPER

3000 SHEETS FANFOLD $42.75
1000 SHEETS FANFOLD $19.75
1000 SHEET LETTER ... $21.95
200 SHEETS LETTER ... $8.99
150 RAG STATIONARY ... $10.99
MAILING LABELS (1in.) ... $9.95
14 x 11 1000 FANFOLD $24.75

INNOVATIVE CONCEPTS
FLIP-N-FILE 10 ..... $3.75
FLIP-N-FILE 15 ..... $8.95
FLIP-N-FILE 25 ..... $18.95
FLIP-N-FILE 50 ..... $17.75
FLIP-N-FILE (ROM HOLDER) ... $17.75

DRIVES

MSD
SD1 DRIVE $259.00
SD2 DRIVE $475.00

INDUS
GT Atari 219
GT Atari 219
GT Commodore 249
GT Apple w/controller 219
GT Apple 169

DISKETTES

SKC
(Box 10)
SKC-SSSD $12.99
SKC-SSDD $15.99
SKC-DSDD $18.99

ELEPHANT
(Box 10)
5¼"SSSD $14.99
5¼"SSDD $16.99
5¼"DSDD $21.99

MAXELL
(Box 10)
5¼"MD-1 ..... $17.95
5¼"MD-2 ..... $23.95

IBM-PC SOFT-WARE

Scarborough
Songwriter $24.75
Picturewrite $32.75
Phi Beta F $32.75
Mastertype $32.75
Run f Money $32.75
Net Worth $54.75

Spinnaker
Alphabet $18.75
Kids on Keys $19.75
Grandma $19.75
Kindercomp $17.75
Facemaker $19.75
Kidwriter $19.75

IBM-PC COMPATABLE

CORONA
PPC22A Portable 256K-Amber ... $1995
PPC22G Portable 256K-Green ... $1995
PPCXTA Portable 256K-10Meg ... $3295
COR128K 128K RAM ... $ 159

Zenith
Z-150 ..... Call

Columbia Data
1600 ..... Call

Televideo
TS1605 ..... Call

Leading Edge
PC Compatable ..... Call

Microprose
Solo Flight $22.75
NATO $22.75
Spitfire $22.95

Graphics Tablet
Supersketch $49.95
Kolala $99.95
Illustrator $99.95
Logo Design $27.95
Grams Spell $27.95

TOLL FREE 1-800-233-8760

MasterCard TO ORDER VISA

CALL TOLL FREE
800-233-8760
Customer Service 1-717-327-1825 Jersey Shore PA 17740

or send order to
Lyco Computer
P O Box 5088

RISK FREE POLICY

In-stock item shipped within 24 hours of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the Continental U.S. PA residents add sales tax. APO, FPO, and International orders add $5.00 plus 3% for priority mail service. Advertised prices show 4% discount for cash, add 4% for Master Card or Visa. Personal checks require 4 weeks clearance before shipping. All items subject to change without notice.

CIRCLE 131 ON READER SERVICE CARD

OUTPOST: ATARI

New computers and peripherals; Plato; rumors

David Small

While sales of the Macintosh have not approached those of the IBM PC, there is another factor to be considered in assessing the popularity of the two machines: more people use—really *use*—Macintoshes than use IBMs. The PC to me represents the Bad Old Days of Computing, complete with disk operating systems, file allocation tables, and other bits of tripe that made computers difficult to use and all but impossible to learn to use. So you tend to find IBM machines dedicated to one application (most commonly, *Lotus 1-2-3*). Macintosh users, in contrast, tend to use their computers in widely varied ways; the Mac is a natural for many applications.

Wait a minute . . . this is the Atari column, right? Why am I raving about the Mac? Ah, the Mac is a great idea with one sticking point: the price. Right now, the best price you can get for a Mac is around $1600, and that is for the 128K, Skinny Mac. To get the most out of the Mac, you need the 512K machine, which will run you $2500 (if you shop around). This is just too much for a computer "for the rest of us."

Tramiel's Surprise: The New ST line

Now enter Jack Tramiel, who darn well knows a good idea when he sees it (like the Mac's user innovations) and also knows how to build an inexpensive machine (like the Vic 20 and Commodore 64).

And witness, a very few months later, the Atari 130ST and the 520ST computers with Macintosh-like capabilities. The (projected) price? For the 128K machine, called the 130ST, $400, not $1600, as for the Mac. And for the 512K machine, the 520ST, an incredible $600, not $2500.

When these prices became known, many computer experts said, "great, if he can do it." This is a disguised compliment to Tramiel; had anyone else in the industry announced machines with these capabilities at such prices, we would have heard a flat "it can't be done."

The machines feature an operating system (the part of the computer that deals with you) called GEM. If you have ever seen a Macintosh, you have seen GEM. If you haven't seen a Mac, check out our July 1984 review.

The Atari machines feature a mouse and the desktop concept implemented in color. What does this mean to you? The new Atari machines will be very easy to learn how to use. They will have the ease of use of the Macintosh at a price long associated with the Atari name.

Had anyone else in the industry announced machines with these capabilities at such prices, we would have heard a flat "it can't be done."

Atari's 130ST and 520ST use the Motorola 68000 microprocessor, a fast and efficient chip, and clock it at 8.0 MHz, which is really fast. The 68000 is a joy to program; if you already know 6502 or 6800 assembler, you will find the transition easy. The 68000 has the genius of a simple instruction set with many options for each instruction. This keeps the number of available instructions manageable.

The 68000 is faster than the IBM chip for two reasons. First, it is clocked much faster (8MHz vs. 4.77 MHz). Second, the 68000 talks to the world 16 bits at a time; whenever the IBM has to communicate, it does it in two 8-bit pieces, which slows it down considerably. The 68000, by the way, is the same chip Apple picked for the Macintosh.

By the way, the current Atari chip runs at 1.79 MHz and is 8-bits only. That is a speedup of four times in clock rate alone. Now add the doubling of 16-bit operations and the overall efficiency of the 68000 . . . and you thought your Atari was fast!

Both of the new ST machines have color video with several modes: 320 x 200 in 16 colors (roughly the same as the current Atari machines), 640 x 200 in four colors (like graphics 7 with much higher resolution), and 600 x 400 in one color (like graphics 8 with much higher resolution). Atari will sell you an RGB color monitor (XC 141) to use with these machines for around $320 (640 x 200) or a monochrome monitor (XM-128) for the 640 x 400 one-color mode for around $170.

The machines are said to have both Centronics parallel and RS-232 serial ports built in; that means that no extra interface is necessary for these machines. (A sigh of relief is heard).

Peripherals

The disk drive for the ST line (SF 354) will be the 3.5" type so familiar to Mac users. It has 500K of storage; the 810 and 1050 have 88K and 128K, respectively. The price, however, may knock your socks off—$100 for a drive. Thus, we are talking about a powerful Macintosh-like product for under $500, complete with disk drive. There is also mention of an SH-317 10Mb hard disk, but no price is mentioned.

Right now we can dispense with two common questions. Will the new Atari machines run IBM software? No. Will they run the old Atari software? No, but . . .

The reason I qualified the second no is that Atari announced two other new machines which are "100% compatible with the XL line of computers." They are the 65XE and the 130XE. The 65XE

Creative Computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 Own	2 Plan to Buy
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	Q
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

Void after June 30, 1985

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # (____)_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery.) CC4853

4 ☐ Please send me one year (12 issues) of *Creative Computing* for 19.97 and bill me. (Full one-year subscription price 24.97.)

Creative Computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 Own	2 Plan to Buy
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	Q
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

Void after June 30, 1985

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # (____)_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery.) CC4852

4 ☐ Please send me one year (12 issues) of *Creative Computing* for 19.97 and bill me. (Full one-year subscription price 24.97.)

Creative Computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 Own	2 Plan to Buy
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	Q
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

Void after June 30, 1985

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # (____)_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery.) CC4851

4 ☐ Please send me one year (12 issues) of *Creative Computing* for 19.97 and bill me. (Full one-year subscription price 24.97.)

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

Creative Computing
P.O. Box 13010
PHILADELPHIA, PA 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

Creative Computing
P.O. Box 13010
PHILADELPHIA, PA 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

Creative Computing
P.O. Box 13010
PHILADELPHIA, PA 19101

has 64K of memory, and the 130XE has 131K.

The New Old XE Line

These are Atari machines that you will know and be comfortable with immediately; the primary changes are internal to cut production costs. One difference you will note immediately is that the "parallel expansion bus" that used to be on the 800XL machine is gone on the 65XE; it will be present on the 130XE, however.

The 6502 processor used in these machines is the same fast, reliable chip used in the previous Atari lines. However, it is given 131K of memory to access in the 130XE model, which offers potential for higher speed and more memory-intensive applications. (Remember, though, that the 6502 cannot access more than 64K directly at any one time; the other 64K is accessed by temporarily turning off a piece of the "regular" 64K memory and turning on the "alternate" 64K memory instead.) Also bear in mind the "numbers game"; normally, a machine with two sets of 64K dynamic memory chips is called a 128K machine, as in the 128K Macintosh or 128K Commodore. In reality, the memory (in decimal) comes out to 131,072 bytes—so Atari one-upped the competition and named the new machine the 130XE, to get a number slightly higher than theirs—typical Tramiel competitiveness, and who knows how much difference it might make to a computer neophyte purchasing a machine? And, of course, the 512K machine is advertised as the 520ST.

The 65XE machine will cost around $100, which is the current price of the 800XL, and the 130XE machine will sell for $200. These prices seem likely to undercut the competition (Commodore) by some 50%.

Also announced was a portable computer with 128K and the same 6502-XL compatibility, called the 65 XEP. Complete with a built in 3 1/2" disk drive and color monitor it sells for around $400.

What about peripherals? There are many. I have mentioned the 3.5" disk drive for the ST series. But the most exciting is a promise of a $400 15Mb hard disk for the ST line by June. That's right, $400. Apparently the ST machines already have a hard disk controller (the expensive part of a hard disk) already built in.

New printers include the XTM 201, XTC 201, and XMM 801, inexpensive dot matrix printers with both color and non-impact versions, running at 20, 20, and 80 cps respectively. The XDM 121 is a 12 cps letter quality daisywheel printer.

Projected shipping dates? April 1 for the XE line; May or June for the ST line.

Rumors

Digital Research has apparently been working with its GEM (Graphics Environment Manager) operating system for a while; GEM works with CP/M-68K, DR's operating system for the 68000 chip. Tramiel had been carrying on discussions with DR for quite some time about this and decided to implement his ideas with his new Atari Corporation.

There was some mention of the Mindset computer being added to the Atari line. Apparently the story was that the new machines were not "brought up" at Atari until three days before the Consumer Electronics Show. So the Mindset was "held in reserve" as a 16-bit color computer in case the 130ST and 520ST didn't pan out. Sounds like the Atari engineers put in a lot of overtime. Bringing up a 68000 prototype computer in six months is astonishing speed.

I've been on Plato since 1978 and highly recommend you look into it.

Very hot rumor: the ST series will be able to run Mac software. (For those of you who are knowledgeable and point to the copyrighted Apple ROMs (prestored programs) that are part of the Mac, remember the MacWorks package for the Lisa has this same information on disk.)

Another hot rumor: The ST may be able to read Mac disks directly.

A final hot rumor: You'll probably find CP/M-68K available for the ST line very soon, which means there will be fast, efficient Pascal, C, Fortran, CBasic, and such available.

Plato

Also worthy of mention is that the Plato cartridge for the XL series of machines is being released finally. If you have been looking for an easy-to-use communications net and for a place with some high quality educational software (100,000 contact hours), it would be a good idea to check out Plato. Plato is a mainframe computer in Minneapolis that has been around for ten years with an astonishingly good selection of courseware—everything from math drills and sentence structure for kids to how to fly a 747 (a simulator that United Airlines uses). The Plato Learning Phone, designed by two software engineers at Atari, Vince Wu and Lane Winner, lets you access Plato for $7.75/hr. (local phone call)—a rate competitive with CompuServe and The Source, certainly. You need either a Microbits 300/1200 baud modem (the 1200 baud modem ought to be announced by the time you read this) or an 850 interface and anyone's 300 or 1200 baud modem.

I've been on Plato since 1978 and highly recommend you look into it. It takes the term "user-friendly" to new heights and is the first computerized society.

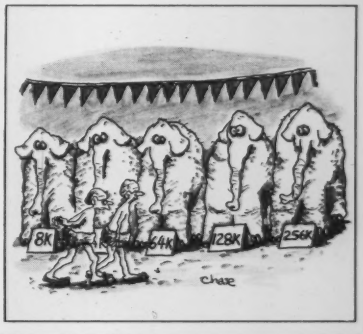
Infinity

Atari has also announced a $49.95 software package which is said to compete favorably with *Lotus 1-2-3*. The price is an indication of another Atari promise: "We won't sell software for over $50." There will be more on *Infinity* in a later column, rest assured.

Conclusion

What does this mean for new computer users? I believe that Atari finally has created what Apple always advertised: "The Computer for the Rest of Us." It has the innovative, easy-to-use Macintosh user interface but none of the high Macintosh pricing.

Now is a better time than ever to get into computers; finally, a computer that comes to you instead of forcing you to come to it. ■



IBM IMAGES

Mini-Reviews of nine useful products

Will Fastie

Keeping up with all the new products that pop out of the woodwork, and some of the old ones, is a formidable chore. I try to spend part of each working day trying something new. Now to some of you, that might sound like the nice part of a job, and I do often find myself enjoying that time. It is also quite a pain—especially when the product ain't so great, or when figuring out how to use it consumes more time than the product is likely ever to save. Mini-Reviews (tm W. Fastie) are my way of calling your attention to some things I have seen.

I know that there are many very fine products out there. In my mini-reviews here, I don't mean to slight any product which competes with the ones mentioned. These are just some that I have used and think deserve a mention.

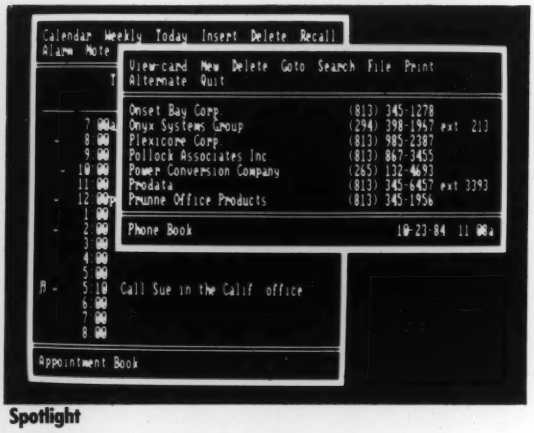
There are also some rotten products around, and I have in the past been utterly fearless in my condemnation of them. It is a happy feeling to be able to say that I can't think of any recent product that is so bad that warnings about it are urgent.

Spotlight

Software Arts' new product is that company's first attempt to deliver a program of mass appeal since *VisiCalc*. *TK!Solver*, powerful and useful as it is, only piques the interest of a narrow segment of the user market. *Spotlight* has broader appeal: it is a useful, thoughtful program, and distribution agreements with IBM and Computerland should ensure wide availability.

Spotlight provides six functions: calendar and appointment management, phone directory, index card files, note pad, calculator, and DOS shell. The functions load into memory and are available at the touch of a key, regardless of the program currently in progress (and assuming enough memory is available at that moment). Because the *Spotlight* supervisor program must reside in memory, and because each "accessory" program is loaded as required, a lot of memory is helpful. *Spotlight* will be faster and more useful on systems with hard disks; although this at first seems to limit the appeal of the program, the number of hard disk-equipped systems is rising as the cost of the hard disk plummets.

I have found the appointment calendar to be superb, rich in features and easy to use. It is the accessory I use most frequently. What really sold me on it was the speed at which I am able to use it while talking on the telephone. I can quickly update my schedule, find conflicts, or make notations for days in the immediate future or days far away. A particularly nice feature is the weekly schedule, which allows regularly scheduled appointments to be noted once but posted automatically to every week. Alarms can be set, and the program keeps and displays meeting durations. The appointment book is not restrictive: it can schedule for any time (as opposed to just quarter-hours, for example).


Calendar Weekly Today Insert Delete Recall
Alarm Note
View-card New Delete Goto Search File Print
Alternate Quit
Onset Bay Corp (813) 345-1278
Onyx Systems Group (294) 398-1967 ext 213
Plexicore Corp (813) 985-2387
Pollock Associates Inc (813) 867-3455
Power Conversion Company (265) 132-4693
Prodata (813) 345-6457 ext 3393
Prunne Office Products (813) 345-1956
Phone Book 10-23-84 11 00a
Call Sue in the Calif office
Appointment Book

Spotlight

For a novice user, the DOS shell program, known as the DOS Filer, is a useful and intelligently constructed utility. I have experimented with it, but use it infrequently because my DOS knowledge is sufficient to allow efficient use of DOS commands.

The phone directory, and a similar card file, are simple data managers for small files. I use the phone book; I have not found a use for the card file. I can think of many, such as client, vendor, or customer files. Because more than one phone book or card file can be maintained, quite a bit of data can be stored with this facility. The newest version of *Spotlight*, update 1.1, allows automatic telephone dialing from the phone book, a nice touch.

Spotlight does need more work before it will really catch on. It is weak in the printing department, resorting to simple printing techniques similar in style to those of the original *VisiCalc*. It needs to provide margins (all around) and print page numbers, for example. I also think more work is needed on the appointment book before it can completely replace my Day Timer, but it is close enough now that I am committed to using both. Its price of $149.95 is a bit steep given these weaknesses, but I am hopeful. Software Arts needs a winner, and this could be it with a little more tuning.

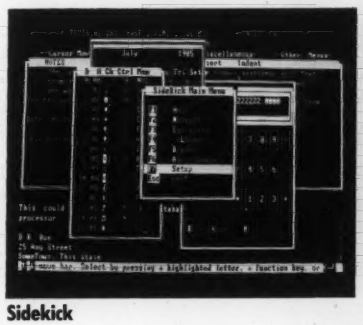
Sidekick and Higgins

The most talked-about competition for *Spotlight* is *Sidekick*, from Borland International (creators of Turbo Pascal). I have very mixed feelings about *Sidekick* because even though it has nice features and a reasonably thoughtful design, I do not trust it.

Frankly, I think *Sidekick* is still a little "buggy," and I have two recent complaints. In the first case, DOS was unable to find a file on a disk after *Sidekick* had been installed, but had no diffi-

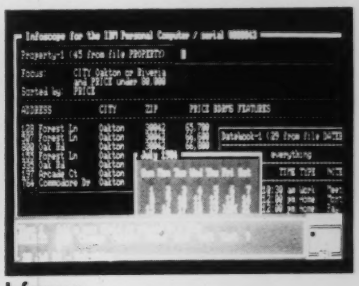
culty without *Sidekick*. This problem, in particular, makes me think the program is not behaving properly. Second, *Sidekick* does not deal with all modes of video display; some images are garbled when *Sidekick* begins to run, although they are properly restored upon exit.

I have heard several complaints from other users, most having to do with programs with which *Sidekick* will or will not run properly. My own experiences, in concert with this other information, make me question the reliability of the product. That is unfortunate, because I have no such uneasiness with Turbo Pascal and would have expected as much from the newer package. I am confident that Borland will rectify these problems, as I have found them to be a responsive and responsible company.



Sidekick

Crosstalk



Infoscope

Higgins is a *Spotlight/Sidekick*-like product which I have not tried myself; I have only been able to watch the self-running demo. If the human interaction of *Higgins* is on a par with that of *Spotlight* or *Sidekick*, it promises to be a formidable competitor. Its notable feature is the way in which it cross-files the information. A posting to the appointment book might, for example, make a notation in a project file, or in a file about a person.

Higgins appears to be maintaining its information in a more complex file than the other products. So I'll have to reserve judgment because that added complexity might serve to make the program cumbersome and slow. I'll report back when I have tested it more fully.

Crosstalk

There can be little question that MicroStuf's *Crosstalk* is the most popular communications program—and with good reason. It is flexible, powerful, and it has an above average human interface.

Arguments will continue to rage about programs which are menu-driven vs. command-driven vs. function-key-driven. *Crosstalk XVI* is command-driven, which seems to be the least favorite alternative nowadays. But the command-driven nature of the program also gives it its most powerful and useful feature: programs (called "scripts" in *Crosstalk* lingo) can be written with the same commands used to run the program interactively. These scripts can so automate the communications process that *Crosstalk* can be made function-key-driven if desired. In fact, I get on to each information service with a single DOS command (a .BAT file with a name like OAG or MCI) and exit back to DOS with a single keystroke. *Crosstalk*, under control of a script, does all the rest, including the log-on sequences.

Crosstalk scripts are flexible. They can handle just about everything that might come up during an on-line session. The new version, 3.5, includes many improvements as well as a script file that automates the process of defining your personal log-on scripts for the most popular on-line services.

Lesser known features of *Crosstalk*, such as its ability to answer the phone and act as a host, even including password protection, round out this versatile program. I think it is the program of choice for anyone with serious communications needs, and its more powerful features allow it to be used as a communications programming language.

InfoScope

Another product from MicroStuf is *InfoScope*, a data management program. Like *Crosstalk*, *InfoScope* has good qualities of interaction with the user. My reason for mentioning it here, though, is the speed with which it operates.

I know of no faster program. Sorts and searches happen almost instantly—a surprise if you are used to more conventional data managers. In fact, *InfoScope* is so fast that one is given to think that there might be a catch. There is.

InfoScope gets most of its speed by keeping all the data in memory at once. This obviously limits the size of a data file,and *InfoScope* is thus best used when the number of records is relatively small. There are certainly many filing jobs that require a limited number of records, so this program is not automatically disqualified. Such a limitation is unusual today, however, so consider the program carefully.

Speed and the human interface are what *InfoScope* has to offer. It is worth a look; keep an open mind about it, though.

Nutshell

Of all the data management packages I have tried over the past year, none has impressed me quite like Nutshell. It has some features that are unique, a flexible reporting capability, and a spiffy user interface.

The two features that distinguish the program are its ability to deal with text and the fact that all fields are indexed. The first might seem trivial, but I know of no other program that handles text as nicely. Most data managers limit a field in a record to a single line, sometimes up to 255 characters. Lately, some programs have emerged that can handle text fields of 4000 characters or so. *Nutshell* allows text fields to be 65,000 characters long but, more importantly, allows them to be displayed as arbitrary rectangles on the screen. Within the rectangle, *Nutshell* acts like a tiny word processor, wrapping the lines as the user enters text. If the text is changed, the new text reformats within the field.

The indexing feature is the main selling point of *Nutshell*. One of the major problems with data management sys-

tems is that so much time must be spent designing a file, organizing screen displays, and deciding how records will be retrieved. Retrieval issues are the most complicated, because the user must generally decide which fields will be used as keys. *Nutshell* eliminates this requirement by indexing everything. Records can be found by specifying any value in a field; retrieval is very fast and is not dependent on the file size.

There is another, more subtle value inherent in the indexing scheme. Because the user does not have to specify keys, and because everything is indexed, records can be retrieved based on criteria that were not even considered when the file was originally created. In many other filing systems, such a change of retrieval criteria forces a major overhaul of the design of the particular file.

Because everything is indexed, *Nutshell* does exact a file size premium. But for those applications requiring text management within the filing system, *Nutshell* shines.

Paradise Modular Display Adapter

Many PC owners are faced with a problem: Having started with an IBM monochrome display and IBM adapter, what is the best way to step up to graphics? There are several good answers to that question. The Paradise Modular Display adapter is a recent answer that offers both short- and long-term solutions on a single board.

The short-term solution is the acquisition of the Paradise card. For the first-time PC buyer or the owner wishing to upgrade from IBM monochrome text to graphics, the Paradise card offers the least expensive way to obtain graphics capabilities. Furthermore, the door is left open for the longer-term solution of adding a color display, because the Paradise board can operate either an IBM Monochrome display or a standard RGB display.

Paradise has put together a software and hardware product that is actually a color graphics card in disguise. Understanding this fact is vital to understanding the value of the device. First and foremost, the MultiDisplay board is completely compatible with the IBM Color/Graphics Adapter and thus will run any program that works with that standard. Or, to speak directly, just about everything. Other boards that deliver graphics to the monochrome display have a graphics resolution that is higher than the IBM standard, but those boards also require a software program to have a special driver. If *Lotus 1-2-3* doesn't have a driver for your SlipShod X23 display board, you're just out of luck. On the other hand, Lotus knows all about the IBM standard.

Second, the board is able to represent all 16 colors with different shades of green (or amber on some displays). Flying the Microsoft *Flight Simulator* is not beautiful on Paradise, but it is perfectly playable.

If you have a PC and monochrome display, or if you are just now looking at one, the Paradise board may make your investment all the more worthwhile by economically expanding the display technology without sacrificing the future.

Turbo Pascal

And now, another word about the product that put Borland International on the map. I won't belabor the point (I'm sure you've heard of Turbo Pascal from any number of sources).

Turbo Pascal is, of course, the software bargain of the century. Borland may be doing more to popularize Pascal than anything that has gone before. In fact, *PC Tech Journal* (that's where I work) has not received unsolicited articles about C for some time, while articles about Turbo just continue to pour in. I think we are going to see a lot more people using Pascal as their primary language, and I think it's all due to Borland. By the way, the company claims to have shipped over 200,000 copies of the language.

Turbo Toolbox is a recent product from Borland that includes an ISAM file manager, a sorting program, and a special utility program. I am just now writing a program to try the file manager, and I have heard very positive things about it. I have not tried the general installation program (GINST) or the sorter. There are technical issues surrounding sorting that make a close look necessary before a recommendation can be made, but it's hard to see how you can go wrong for $49.95.

Turbo Tutor is a new product from Borland that rounds out the Turbo Pascal family. It is a book and a diskette full of routines and small programs, some of which are useful additions to a Pascal library. My brother, a novice programmer who does not know Pascal, was given all the Turbo Pascal products for Christmas; we'll see how he fares as a test of the *Tutor*.

WordPerfect

Finally, a word about an old friend of mine. *WordPerfect* is now available in Version 4, and it is something to behold. There are too many new features to list here, but among the more impressive are the new dictionary and the indexer. *WordPerfect* also gained a facility for maintaining a table of contents and up to six other tables, such as a list of figures. There's much more.

I know I must sound like a broken record on this subject. In a future column, I will discuss *MultiMate* and *Wordstar 2000*, as well as some of the other products in the genre. *MultiMate* has evolved quite a bit since I tested it several years ago, and deserves a new look. *Wordstar 2000*, of course, is MicroPro's all-new revision of *Wordstar*; we could hardly pass it up.

I hope these brief looks at a few of the most interesting products prove helpful. ■

Firms Mentioned in This Column

Software Arts
27 Mica Lane
Wellesley, MA 02181
(617) 237-4000

Borland International
4807 Scotts Valley Dr.
Scotts Valley, CA 95066
(800) 255-8008
In CA (800) 742-1133

Concentric Data Systems, Inc.
18 Lyman St.
Westboro, MA 10581
(617) 366-1122

Paradise Systems, Inc.
150 N. Hill Dr., Suite 8
Brisbane, Ca 94005
(415) 468-6000

Satellite Software International
288 West Center
Orem, UT 84057
(801) 224-8557

Microstuf, Inc.
1000 Holcomb Wood Pkwy., Suite 440
Roswell, GA 30076
(404) 998-3998

Leading Edge Products, Inc.
225 Turnpike St.
Canton, MA 02021
(617) 828-8150

CREATIVE COMPUTING MARKETPLACE

CLASSIFIED RATES: Per Word, 15 Word Minimum. **REGULAR:** $3.50. **EXPAND-AD®:** $5.25. Ads set in all bold type at 20% premium. Ads set with background screen @ 25% premium. **GENERAL INFORMATION:** Prepayment discounts available. Payment must accompany order except credit card—Am. Ex., Diners, MC, VISA (include exp. date)— or accredited ad agency insertions. Copy subject to publisher's approval; must be typewritten or printed. First word set in caps. Advertisers using P.O. Boxes MUST supply permanent address and telephone number. Orders not acknowledged. They will appear in next available issue after receipt. Closing date: 5th of the 3rd month preceding cover date (e.g., April issue closes Jan. 5th). Send order & remittance to: Classified Advertising, **CREATIVE COMPUTING** Magazine, 1 Park Avenue, New York, N.Y. 10016. To charge your ad to a major credit card, call Lois Price at (212) 503-5115. For Customer Service, call (212) 503-4506.

SOFTWARE

HORSE & DOG HANDICAPPING PROGRAMS FOR MOST PERSONAL COMPUTERS. Free Catalog: Gambler's Edge Computing, Dept B4, 250 Richards Rd., Ste. 254, Kansas City, MO 64116.

COMMODORE 64/VIC 20 Games/educational software. Over 4000 titles! Write for FREE catalog! American Peripherals, 122 Bangor St., Lindenhurst, NY 11757.

TI-994A SOFTWARE/HARDWARE bargains. Hard to find items. Huge selection. Fast service. Free catalog. DYNAMO, Box 690, Hicksville, NY 11801.

USED SOFTWARE! Buy or sell all computers, free catalog. Software Exchange Inc., Box 485, Hales Corner, WI 53130.

WORLD'S LARGEST SOFTWARE LOCATOR SERVICE—with 39,000+ listings. Let SOFSEARCH find that hard to locate software package. Call now: 1-(800) 531-5955 or (813) 481-4994.

BIBLE SOFTWARE FOR PERSONAL COMPUTERS. For home, school, church. Over 70 titles from 21 publishers. Apple, Atari, Commodore, IBM, Color Computer. Write for free catalog. Manna Computing Concepts, PO Box 527, Dept. CC, Woodstock, GA 30188.

Write for FREE 120 page catalog. DYNACOMP, P.O. Box 18129, Rochester, NY 14618. State Computer.

A#1 EXCITING game and home management software. Send SASE for FREE list. Warren Enterprises, Route 25, Calverton, NY 11933.

FIND THE RIGHT SOFTWARE. Custom listing for your task, hardware, and budget. Send for introductory offer. Soflist Co., 1513 No. Wilcox, Suite 547, Los Angeles, CA 90028.

TRY BEFORE YOU BUY!!! TI-Users save money by renting software from the SOFTWARE USERS EXCHANGE. Dept. E, P.O. Box 49, Cumberland, PA 17070. Free Brochure!

CONTRACT BRIDGE GAME software—$39.95. Apple, IBM, TI99-4A, Commodore 64-16-'VIC-+4, TRS 80-1-3-4-CoCo. Others. Immediate shipment. Send check to Authors; John and Lynda Allan, Azilda, Ontario, P0M-1B0, Canada. (705) 983-4341.

TEXAS MODEM FOR COMMODORE 64. The Best Poker Program to Date. Send $29.95 for Tape or Disk. GOLDRUSH, 5646 No. Pershing, Stockton, CA 95207.

HARNESS AND THOROUGHBRED HANDICAPPING PACKAGE ... $29.95. FREE INFORMATION! SOFTWARE EXCHANGE, Box 5382, West Bloomfield, Michigan 48033.

FREE EDUCATIONAL SOFTWARE CATALOG—Pet, Commodore 64, Apple II+, TRS-80—Island Software, PO Box 300, Dept. G, Lake Grove, NY 11755. (516) 585-3755.

SOFTWARE/LANGUAGES

SNOBOL 4 LANGUAGE for IBM PC includes ELIZA, VISA/MC $44.95, Berstis International, Box 441, Millwood, NY 10546. (914) 271-5855.

SOFTWARE/EDUCATIONAL

EDUCATIONAL SOFTWARE. Large selection. All grade levels. Discount prices. Write for FREE catalog stating computer model. GET SMART, Box 1067, Rockville Centre, NY 11571.

SOFTWARE/TAXES

YEAR ROUND TAX PROGRAM. Tax time saver for Apple, IBM, and compatibles. Professional and individual editions, $95.00 and up. Satisfaction or your money back. P. Douglas & Assoc., P.O. Box 208, Dep. CC, Kerkhoven, MN 56252. (612) 599-4308.

ALARMS

ALARM SYSTEMS DESIGNED TO PROTECT YOUR PERSONAL COMPUTER. Unsupervised system $250 + shipping, supervised system $360 + shipping. Write or call for more information; CUSTOM-EASE ALARMS, 5314 West 25th Place, Cicero, IL 60650. (312) 652-3850.

BUSINESS OPPORTUNITIES

$3000.00 per month spare time income with your computer! Free details. Digatek Corporation, 2723 West Butler Drive, Suite B, Phoenix, AZ 85021.

MAIL ORDER OPPORTUNITY! Start profitable home business without experience or capital. Information free. Mail Order Associates, Inc., Dept. 624, Montvale, NJ 07645.

COMPUTER EQUIPMENT/SUPPLIES

DISCOUNT COMPUTER SUPPLIES. Write for free catalog. Mail to C.R.E. Wholesale, P.O. Box 361, North Salt Lake, Utah 84054.

PROGRAM PACKAGING AND SUPPLIES. Binders, Slipcases, Game Portfolios, Disk, Etc. FREE CATALOG. Anthro Systems, 376 East St. Charles Rd., Dept. CC, Lombard, IL 60148. (312) 629-5160.

DON'T NOTCH THAT DISK! To use both sides of your disk. Modify your read/write protect switch. Instructions and necessary parts included. Send $12.95 to MicroScot, P.O. Box 768, Rocklin, CA 95677. (916) 624-5636 evenings.

COMPUTER PUBLICATIONS

"DISK DRIVE MANUAL"—Drive Alignment, Adjustments, Preventive Maintenance, Diagnostics, Troubleshooting, Repairs—Without Special, Expensive Software, Equipment. Comprehensive. $19.90. Brochure $1. WILLIAMS, M.S.E.E., 2011 Crescent, Alamogordo, NM 88310.

LASERWORKS. Videodisc Newsletter, $12/yr. Write for FREE sample. P.O. BOX 250031A, Los Angeles, CA 90025.

ELECTRONIC DIRECTORY—1500 manufacturers and distributors. Lists products and key personnel, sources for books, periodicals, and free pamphlets, films, and catalogue showing textbooks, training aids, lab manuals on electonics-basic, industrial, T.V. and radio. $19.95 or send $2.00 for details (refundable). CONSUMER MARKETING, 240 N. 100 W., Logan, Utah 84321. (801) 752-0855.

EMPLOYEE MOTIVATIONAL programs publisher looking for original ideas for humorous situations relating to the data processing industry. Will pay $50 for any idea used. Reply P.O. Box 7287, Wilmington, DE 19803.

COMMODORE 64

MUTANT NERDS—Exterminate waves of Nerds, geek birds, and nerd babies with explosive spit balls. Jump over molten lava pits. This machine language arcade style game is an audio visual masterpiece. Commodore-64 disk 12.95. Free information or orders; CRUSTYWARE Flint Hall, Box 15, Syracuse, NY 13210. (315) 423-0360.

COMMODORE 64 SOFTWARE. Free price list. WMJ Data Systems, Dept. CC64, 4 Butterfly Drive, Hauppauge, NY 11788.

FSP PAYS $$$ FOR EDUCATIONAL PROGRAMS. DISK SAMPLE BRINGS CONFIDENTIAL EVAL/OFFER. 71 Hilltop, Randolf, NJ 07869.

Adult Adventure for Commodore-64. Disc/Tape: $19.95. SASE FOR DETAILS, FTW, Box 31017, Dayton, OHIO 45431.

HARDWARE

Apple Works $199.! HP Laser Printer $2990.! Panasonic Senior Partner, more! Free Catalog. DCA-1, 445 North Pine, Reedsburgh, WI 53959.

TIMEX/SINCLAIR

SPEECH synthesizer. Timex: TS2068/1500/1000. ML-program, multiple vocabularies, flexible memory requirements, very intelligible. Comes complete. Includes 273 words. Expandable. $16.95 p.p. TAD PAINTER, Box 166055, Irving, TX 75016.

NEW T/S PUBLICATION: Quarter S. T/S information four times per year for only $8.00. Check to WMJ Data Systems, 4 Butterfly Drive, Hauppauge, NY 11788.

TRS-80

Co-Co-Nut Software. Over 500 TRS-80 programs. Write/Call for price list. Site 9, Box 1, R.R. 2 Tofield, Alberta, Canada TOB 4J0. (403) 662-2415.

THIS MAGAZINE IS AVAILABLE IN MICROFORM
DIRECT INQUIRIES TO:
MICRO PHOTO DIVISION
BELL & HOWELL
OLD MANSFIELD ROAD
WOOSTER OH 44691
Contact Christine Ellis
Call toll-free (800) 321-9881
In Ohio, call (216) 264-6666 collect

"AD FRIENDLY"

The editorial environment that attracts cover-to-cover readership and lets your classified ad get the attention it deserves!

The rates that make it advantageous for you to run classified ads as frequently as you like!

The audience that's eager to buy and keeps increasing monthly! High pass-along readership, too.

Phone us now for rates, sizes, and classified ad options.

Classified Advertising
ZIFF-DAVIS PUBLISHING COMPANY
Computer Publications Division

CALL 212-725-4215

CREATIVE COMPUTING RETAIL ROSTER

ARIZONA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals.

CALIFORNIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. ANAHEIM—330 E. Ball Rd., (714) 776-9420. CAMPBELL—2350 S. Bascom Ave., (408) 377-8920. EL CERRITO—6000 Potrero Ave., (415) 236-8870. LA MESA—8363 Center Drive, (714) 461-0110. LOS ANGELES—2309 S. Flower St., (213) 749-0261. POMONA—1555 N. Orange Grove Ave., (714) 623-3543. REDWOOD CITY—2001 Middlefield Rd., (415) 365-8155. SACRAMENTO—1860 Fulton Ave., (916) 486-1575. WOODLAND HILLS—22504 Ventura Blvd., (213) 883-0531.

COLORADO

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. DENVER—5940 W. 38th Ave., (303) 422-3408.

CONNECTICUT

EXECUTIVE SOFTWARE–Stamford–(203) 359-2604. Dedicated to excellence in microcomputers! Authorized dealer for KAYPRO & ALTOS.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. AVON—395 W. Main St. (Rt. 44). (203) 678-0323.

FLORIDA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. HIALEAH—4705 W. 16th Ave., (305) 823-2280. JACKSONVILLE—8262 Arlington Expressway. (904) 725-4554. PLANTATION—7173 W. Broward Blvd., (305) 791-7300. TAMPA—4109 Hillsborough Ave., (813) 886-2541. FT. LAUDERDALE—7173 W. Broward Blvd. (305) 791-7300.

GEORGIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. ATLANTA—5285 Roswell Rd., (404) 252-4341.

HAWAII

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software. Peripherals. HONOLULU—98-1254 Kaahumanu St., Pearl City, (808) 487-0029.

ILLINOIS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. Chicago—3462-66 W. Devon Ave., (312) 583-3920. DOWNERS GROVE—224 Ogden Ave., (312) 852-1304.

INDIANA

INDIANA HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. INDIANAPOLIS—2112 E. 62nd St., (317) 257-4321.

KANSAS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. MISSION—5960 Lamar Ave., (913) 362-4486.

KENTUCKY

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. Louisville—12401 Shelbyville Road. (502) 245-7811.

LOUISIANA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. KENNER—1900 veterans, Memorial Hwy., (504) 467-6321.

MARYLAND

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. BALTIMORE—1713 E. Joppa Rd., (301) 661-4446. ROCKVILLE—5542 Nicholson Lane, (301) 881-5420.

MASSACHUSETTS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. PEABODY—242 Andover St., (617) 531-9330. WELLESLEY—165 Worchester Ave., (617) 237-1510.

MICHIGAN

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. E. DETROIT—18149 E. Eight Mile Road, (313) 772-0416. FARMINGTON HILLS—29433 Orchard Lake Road, (313) 555-4171.

MINNESOTA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals, HOPKINS—101 Shady Oak Road (612) 938-6371. St. PAUL—1645 White Bear Ave. (612) 778-1211.

MISSOURI

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. ST. LOUIS—3794 McKelvey Road (314) 291-1850.

NEBRASKA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. OMAHA—9207 Maple St., (402) 391-2071.

NEW YORK

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. AMHERST—3476 Sheridan Dr., (716) 835-3090. ROCHESTER—937 Jefferson Rd., (716) 424-2560. N. WHITE PLAINS—7 Reservoir Rd., (914) 761-7690. Jericho, L.I.—15 Jericho Turnpike, (516) 334-8181.

NORTH CAROLINA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. GREENSBORO—4820 W. Market St., (919) 299-5390.

OHIO

NORTH COAST COMPUTERS, 650 Dover Center, Bay Village 44140, 216-835-4345. 100 N. Main, Chagrin Falls. Apple, Lisa, Vector Graphics, Hewlett-Packard. (216) 247-2202.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. CINCINNATI—10133 Springfield Pike, Woodlawn, (513) 771-8850. CLEVELAND—28100 Chagrin Blvd., (216) 292-7553. COLUMBUS—2500 MORSE ROAD, (614) 475-7200. TOLEDO—48 S. Byrne Road, (419) 537-1887.

OKLAHOMA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. OKLAHOMA CITY—2727 Northwest Expressway. (405) 848-7593.

PENNSYLVANIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals PHILADELPHIA—6318 Roosevelt Ave., (215) 288-0180. FRAZER—630 Lancaster Pike, (Rt. 30), (215) 647-5555. PITTSBURGH—3482 Wm. Penn. Hwy., (412) 824-3564.

RHODE ISLAND

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. WARWICK—558 Greenwich Ave., (401) 738-5150.

TEXAS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. DALLAS—2715 Ross Ave., (214) 826-4053. FORT WORTH—6825-A. Green Oaks Road. (817) 737-8822. HOUSTON—1704 W. Loop N., (713) 869-5263. NORTH HOUSTON—5050 FM 1960 West (713) 583-1163. SAN ANTONIO—7111 Blanco Road, (512) 341-8876.

UTAH

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. MIDVALE—58 East 7200 South, (801) 566-4626.

VIRGINIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. ALEXANDRIA—6201 Richmond Hwy., (703) 765-5515. VIRGINIA BEACH—1055 Independence Blvd., (804) 460-0997.

WASHINGTON

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. SEATTLE—505 8th Ave., North, (206) 682-2172. TUKWILA—15439 53rd Ave., South, (206) 246-5358. VANCOUVER—516 S.E. Chaklov Dr., (206) 254-4441.

CREATIVE COMPUTING DIRECTORY

PUBLICATIONS CATALOGS

PC BUYERS GUIDE

THE INDEPENDENT GUIDE TO PRODUCTS AND SERVICES FOR IBM Personal Computers. This master directory lists, describes, rates for ease of use, and tells you about the latest in software, hardware, accessories, supplies, books, services, et al. Everything for you and your IBM PC. It even includes an Index of Computer Camps for both adults and children. From the publishers of PC. An ideal gift at only $7.95 (+ $1.55 shipping/handling) to U.S. destinations; and $11.00 elsewhere. Residents of CA, CO, CT, DC, FL, IL, MA, MD, NJ, and NY add applicable sales tax. Checks or MasterCard or VISA acceptable (with number, expiration date and signature). U.S. funds only. Mail to:
PC BUYERS GUIDE
CN 1914
Morristown, NJ 07960

SOFTWARE/BUSINESS OPPORTUNITIES

ATTENTION SOFTWARE DEVELOPERS

We are interested in receiving your completed package and business plan. Hammer Computer Systems Inc. is in the software publishing business. Please send inquiries and complete portfolio to:
Thomas A. Horvath, Vice President of Sales and Marketing

HAMMER

Hammer Computer Systems, Inc.
700 Larkspur Landing Circle, Suite 285
Larkspur, CA 94939
(415) 461-7633

SOFTWARE/UTILITIES

COLOR COMPUTER USERS

Zapcomp—disk sector editor single & double density. 51X24 screen $29.95. Distributor & dealer inquiries invited. Send for free catalog.
RUFF SOFTWARE
508 Cromwell Ct., Dept 1001
Belton, MO 64012
(816) 331-7118

TAPE TO DISK CONVERSION

CONVERSION SERVICES

Convert any 9 track magnetic tape to or from over 200 formats including 3½", 5¼", 8" disk formats & word processors. Disk to disk conversions also avail. Call for more info.
PIVAR COMPUTING SERVICES, INC.,
47 W. Dundee Rd.
Wheeling, IL 60090
(312) 459-6010

CREATIVE COMPUTING MART

TAPE WORLD

1-800-245-6000

maxell.		Dysan	
MD-1	5¼", SSDD ... 1.69	104/1D	5¼", SSDD .. 1.89
MD-2	5¼", DSDD ... 2.39	104/2D	5¼", DSDD .. 2.69
FD-1	8", SSDD 2.69	3740/1D	8", SSDD .. 2.69
FD-2	8", DSDD 3.29	3740/2D	8", DSDD .. 3.29

MEMOREX		IBM	
5¼" SSDD	1.79	5¼" SSDD	1.99
5¼" DSDD	2.39	5¼" DSDD	2.59

BASF		SCOTCH	
5¼" SSDD	1.49	5¼"SSDD	1.69
5¼" DSDD	1.99	5¼"DSDD	2.39

VERBATIM		ELEPHANT	
5¼" SSDD	1.69	5¼"SSDD	1.59
5¼" DSDD	2.39	5¼"DSDD	2.19

WE WILL BEAT ANY PRICE BY 3%

Sold in 10 Packs. Shipping 3.75 any size order.*
Pre-paid, COD, or credit card. COD add 1.95
SCHOOLS & GOVT. ON PO.
Also, TDK, and Maxell audio and video cassettes.

220 SPRING ST. BOX 361 BUTLER, PA 16001
412-283-8621 M-Fri. 8:30-5:00

wabash DATATECH DISKETTES

Lifetime Warranty–100% Certified

***FREE UPS DELIVERY**

5¼" SINGLE SIDE SINGLE DENSITY 48 TPI W/HUB RING Packed 10 per Soft Pack	$1.05 each QTY 20	BULK SSSD 100/Case White Envelope W/HUB RING	89¢ each
5¼" SINGLE SIDE SINGLE DENSITY 48 TPI W/HUB RING Packed 10 per Soft Pack	$1.25 each QTY 20	BULK SSDD 100/Case White Envelope W/HUB RING	$1.07 each
5¼" DOUBLE SIDE DOUBLE DENSITY 48 TPI W/HUB RING Packed 10 per Soft Pack	$1.65 each QTY 20	BULK DSDD 100/Case White Envelope W/HUB RING	$1.42 each

24 Hour Order Desk

TOLL FREE NAT'L 1-800-634-2248

Visa, MasterCard, Cert. chk., M/O, C.O.D. cash.
Get immediate shipment. Schools & govt. on P.O. #.
Personal or company checks held 14 days.
APO, FPO. Can. and other non-UPS delivered, add $5.
*Free delivery on minimum orders of $50 or more. Others add $2 for S & H.

Software Services™
1323 23rd Street South, Suite C-2, Fargo, ND 58103 1-701-280-0121

COMPUTER & SOFTWARE PROTECTION from PENGUIN

K-COVER
An anti-static, unbreakable, Computer keyboard protector.
FP883 w/o hinges - $7.95 ea.
FP884H w/hinges - $9.95 ea.
For most micro-computer keyboards to 5" X 14½"
FP885H, IBM PC & most compatible keyboards to 5¼" X 17" - $12.95
FP886H, Macintosh & Apple IIc - $10.95
LIFETIME GUARANTEE AGAINST BREAKAGE

strongbox
Holds up to 8-5¼" Diskettes
SP-1200 DISKETTE $2.95 ea.
SP-1202 CASSETTE $2.95 ea.
Both available with EMI Shield - $4.49 ea.
Colors-Black, Grey, Blue, Green, Putty, Yellow, Almond, Melon, Red

MONITOR STANDS
TILT 25° & SWIVEL 360°
1400, Universal - 1450 Macintosh - $29.95 ea.
1900, Universal with Surge Protector/Filter, 4 Power Outlets, Illuminated Control Switch, & Circuit Breaker - $89.95 ea.

PAINTED METAL PRINTER STANDS
PS1680, 80 Column Printers - $29.95
PS1682, 132 Column Printers - $36.95
PS1685, Apple, Macintosh Printer - $29.95

MOST ITEMS SHIPPED IN TIME FOR CHRISTMAS

Penguin Products
P.O. Box 7008
Roseville, MI 48305-7008

INCLUDE $1.50 SHIPPING
CHECK, MONEY ORDER,
VISA & MASTERCARD ACCEPTED.
Call toll-free 1-800-732-0614
In Mich. (313) 774-2228

Now available for the computer experimenter!

COMPUTER CONNOISSEUR'S DELIGHT!

NOW BE IN CONTROL WITH YOUR COMPUTER — THE ONLY PUBLICATION OF ITS KIND WRITTEN FOR THE USER. DISCOVER THE SECRETS AND LEARN THE VERSATILITY OF MODERN COMPUTER COMMAND CONTROL CONCEPTS. EXPERIMENT WITH COMPUTER AND TELEPHONE SYSTEMS. INTERFACE THEM. LEARN HOW THEY WORK. WHAT THEY DO. . . AND HOW TO GET THEM TO WORK FOR YOU! A COMPLETE TELEPHONE ENGINEERING COURSE IS INCLUDED IN MONTHLY CHAPTERS, BRINGING YOU THROUGH STEP, CROSSBAR, ESS, BUBBLE, AND ATOMIC SWITCHING SYSTEMS! EXCLUSIVE COVERAGE IN BIOLOGICAL COMPUTING SYSTEMS, TOO! COMPUTERS AND TELEPHONES ARE THE FUTURE. THIS PUBLICATION IS AN ABSOLUTE MUST FOR EVERYONE INTERESTED.

UNPUBLISHED MATERIAL
WIT
COMICS
DIRECTORY LISTING NET-WORKS
AC-CESS CODES

The one you've all been waiting for

NOW AVAILABLE — Learn how to repair telephones and telephone systems, how they work, in monthly installments with the magazine for you.

Computel PUBLISHED MONTHLY

ONE YEAR SUBSCRIPTION $14.00
(SAMPLE COPY $1.00)
SUBSCRIPTION & 2 PROGRAMS $20.00
Credit Card Only 1-800-6-COMPUTEL (Everywhere EXCEPT California) 1-800-5-COMPUTEL (Calif. Calls Only)

COMPUTEL—the complete SOURCE for everyone. You can now do the things you've only heard about, right in the privacy of your own home. Indispensable reference to phreaks and hackers. Learn how to get all kinds of computer programs FREE. Get the inside story of big business systems—their quirks and flaws—and remain up to date with vital occurrences within the computer industry. Computel is a publication designed for everyone who has an intense curiosity of computer systems, containing a wealth of hard to find information, codes, and numbers. Published monthly.

Computel Publishing Society
6354 VAN NUYS BL., #161-C/VAN NUYS, CA 91401

DISKETTES
Holiday Special

FREE Head-Cleaning Kit, $9.60 Value
FREE: Plastic Library Case with each box of 10 5¼" soft sector Datalife Diskettes
SS/DD $19.95 DS/DD $29.95

Gemini 10X, 120 CPS Bi-directional	$244
Gemini 15X, 120 CPS Bi-directional	$365
Powertype Daisy Wheel **Letter Quality,** Dual interface, Bi-directional, Reverse paper feed	$345

Shipping and Handling $3.00 for any size order of diskettes, $9.00 for printers, C.O.D. orders add $1.65. We accept credit cards at NO extra charge. Illinois residents please add 7% sales tax.

Call now TOLL FREE ANYWHERE in the US
Nationwide 1 800 336 6875
Illinois 1 800 942 5200
International 1 312 256 4456
9 a.m. - 6 p.m. (Central) Mon. through Fri.

SMART DATA INC.
P.O. Box 297
Wilmette, IL 60091
(312) 256-4456

THE $3.95 PERIPHERAL THAT CAN SAVE YOU HUNDREDS OF DOLLARS

Before you shop, consult the CREATIVE COMPUTING 1985 BUYER'S GUIDE TO PERSONAL COMPUTERS & PERIPHERALS—the complete hardware sourcebook with in-depth product listings, comparative charts and evaluations of hundreds of new microcomputers and peripherals. It will connect you to the best values in new computer equipment.

Available at your local newsstand and computer store.

CIRCLE 306 ON READER SERVICE CARD

Datalife Verbatim
Datalife Diskettes

5 Year Warranty–100% Certified

$1.69 each	5¼" SSDD	$2.20 each	5¼" DSDD

Regular 10 packed sleeves, reinforced hubs with identification labels and write protect tabs included.

OTHERS AVAILABLE

5¼"	SSQD	MD 577-01	#18212 $2.93
5¼"	DSQD	MD 577-01	#18239 3.67
8"	SSSD	FD 34-9000	#18113 $2.30
8"	DSDD	DD 34-4001	#18071 2.75
3½"	SSDD	MF 350-01	#900996M 3.50

DATALIFE HEAD ALIGNMENT & CLEANING

5¼" Head Cleaners Kit	#2144	$ 5.00
5¼" Refill Kit for 10 Cleanings	#2145	8.00
5¼" Disk Drive Analyzer Apple Version	#26355	$20.00
IBM Version	#27660	$20.00

24 Hour Order Desk

TOLL FREE NAT'L 1-800-634-2248

Visa, MasterCard, Cert. chk., M/O, C.O.D. cash.
Get immediate shipment. Schools & govt. on P.O. #.
Personal or company checks held 14 days.
APO, FPO. Can. and other non-UPS delivered, add $5.
*Free delivery on minimum orders of $50 or more. Others add $2 for S & H.

Software Services™
1323 23rd St. South, Suite C, Fargo, ND 58103 1-701-280-0121

Dysan DISKETTES
LIFETIME WARRANTY

Box of ten 5¼" soft or hard sectored Dysan diskettes with envelopes, labels and reinforced hub-rings.

SS/DD $19.95 DS/DD $29.95
SS/QD $34.95 DS/QD $42.95

EPSON PRINTERS — SALE
Dot Matrix, Bidirectional with Logic Seeking, Paper Feed and Tractor Feed:

RX 80 100 CPS	$239.00
RX 80 F/T 100 CPS	$285.00
RX 100 100 CPS	$469.00
FX 80 160 CPS, 2 K Buffer	$395.00

Shipping and Handling $3.00 for any size order of diskettes, $9.00 for printers, C.O.D. orders add $1.65. We accept credit cards at NO extra charge. Illinois residents please add 7% sales tax.

Call now TOLL FREE ANYWHERE in the US
Nationwide 1 800 336 6875
Illinois 1 800 942 5200
International 1 312 256 4456
9 a.m. - 6 p.m. (Central) Mon. through Fri.

SMART DATA INC.
P.O. Box 297
Wilmette, IL 60091
(312) 256-4456

NEW

Monitor Mover Gives Back the Desk

$159.95

- Models to fit most CRT's
- Rotates 360° on base
- Adjustable height
- Support tray swivels and tilts
- Holds up to 50 lbs
- Clamp, screw and wall mountings

LirTek
P.O. Box 8056
Grand Rapids, MI 49508
(616) 241-4040

CAPTAIN MEGABYTE

5195 N.E. 12TH AVE • FORT LAUDERDALE FL 33334

Now One Low Price,

THE CHOICE IS YOURS

*ALL MAJOR BRANDS

SS/DD 5" $19.99

DS/DD 5" $24.99

DISCOUNTS AVAILABLE IN 8", QUAD, 3½" & BULK DISKETTES

MEMOREX • VERBATIM • MAXELL • CDC • 3M

*SPECIAL LOW PRICES • Bulk Diskettes • Multi-Color Diskettes

Retail at Wholesale Prices

ASK FOR FREE CATALOG FULL OF NEW ITEMS

C.O.D.'s ACCEPTED VISA

ADD $2.50 HANDLING PER CASE

Call the Captain 1-800-327-1013

(305) 491-2300

*Some Brands Not Listed May Be Slightly Higher!!

CIRCLE 314 ON READER SERVICE CARD

USE YOUR HOME COMPUTER TO TRACE YOUR FAMILY ROOTS WITH

MICRO ROOTS

7411 Riggs Road, Suite A 104

Adelphi, MD 20783 • 301-460-0754

• The bi-monthly newsletter for the personal/home micro computer user. • Details cost, source and availability of 57 genealogical programs & features for 21 different personal/home computers. • Articles written by other users and professionals. • Clearing house for genealogical Remote Bulletin Board Systems (RBBS). • Questions answered, problems solved, information and experiences shared. • Ideal newsletter/journal for the user at any level including beginners.

MICRO ROOTS

NOW JUST $24.95

Cut out, place in an envelope and mail to:

MICRO ROOTS

7411 Riggs Road, Suite A 104 Adelphi, Maryland 20783

Yes, enclosed is my check or money order for $24.95.

Please send me a subscription for Microroots.

Name _____

Address _____

City _____ State _____ Zip _____

CIRCLE 323 ON READER SERVICE CARD

Maxell Floppy Disks

The Mini-Disks with maximum quality.

Dealer inquiries invited. C.O.D's accepted. Call FREE (800) 235-4137.

PACIFIC EXCHANGES

100 Foothill Blvd. San Luis San Luis Obispo. CA 93401 In Cal call (800) 592-5935 or (805)543-1037

CIRCLE 322 ON READER SERVICE CARD

THE BUYERS GUIDE

THE MASTER DIRECTORY OF PRODUCTS FOR THE IBM PC, PC XT, PCjr AND MOST COMPATIBLES!

AVAILABLE AT YOUR LOCAL NEWSSTAND AND COMPUTER STORE.

wabash®

Warranted Integrity, Incredible Value

DISKETTES

M11	5¼"	SINGLE SIDE SINGLE DENSITY SOFT SECTOR	$1.19
M13	5¼"	SINGLE SIDE DOUBLE DENSITY SOFT SECTOR	$1.29
M14	5¼"	DOUBLE SIDE DOUBLE DENSITY SOFT SECTOR	$1.59

SOLD IN BOXES OF TEN ONLY

tremendous selection of software books, accessories and supplies

UP TO 50% OFF!

Software for IBM PC

dBase III	349	Multimate	269
Framework	349	Symphony	419
Home Acct. Plus	89	Wordstar 2000	279
* w/Ultrafile	149	Wordstar Pro Pac	249

ABOVE SOFTWARE AVAILABLE IN OTHER FORMATS, CALL FOR AVAILABILITY AND PRICE.

Minimum shipping and handling $2.00. California residents add 6% sales tax. Prices subject to change without notice. Write for our free catalog.

ABC data products

3311 ADAMS AVE, SAN DIEGO, CA 92116

619-283-5488 800-854-1555

CIRCLE 305 ON READER SERVICE CARD

Dysan CORPORATION

Solve your disc problems, buy 100% surface tested Dysan diskettes. All orders shipped from stock, within 24 hours. Call toll FREE (800) 235-4137 for prices and information. Visa and Master Card accepted.

PACIFIC EXCHANGES

100 Foothill Blvd San Luis Obispo. CA 93401 (In Cal call (805) 543-1037)

CIRCLE 322 ON READER SERVICE CARD

INDEX TO ADVERTISERS

Reader Service No.	Advertiser	Page
108	Arrays, Inc./Continental Software	110
119	Avatex	26, 27
101	BASF	63
*	Batteries Included	25
102	Borland	14, 15
159	BRS After Dark	31
121	Chase Scientific	61
111	Compuserve	9
105	Computerbanc	85
106	Computer Discount Products	92
107	Computer Mail Order	114, 115
109	Computer Management Co.	85
110	Computer Solutions	85
114	Conroy La-Pointe	70, 71
112	C.P. Aids	44
123	Davidson	69
120	DBI	7
122	Fastrack	94
115	General Electric	39
117	HBJ	6
125	Hayes	35
126	Howard Sams	75
127	IBM	48, 49
*	The Ideaworks	18
128	Indus Tool	95
134	Kensington	37
130	Leading Edge	Cov 4
131	Lyco Computing	118, 119
132	Megahaus	59
133	Microsoft	20, 21
135	Nonagon	43
137	Oberon	11
138	OHM Electronics	13
139	Olympus Education	110
140	Opportunities for Learning	113
141	Opus	8
143	Professional Handicapping	95
144	Prometheus Products	54
145	Protecto	96, 97
156	Quark	103
136	Quarterdeck Desq	104, 105
149	Quinsept	110
150	Radio Shack	78, 79
177	Ring King Visables	30
167	Rolland	1
243	Sakata	5
153	Scarborough	19
178	Screenplay	83
157	The Source	29
155	Spectrum Holobyte	36
166	Starshine	113
173	Sublogic	23
165	SWP	88
158	Tecmar	Cover 2
160	Terrapin	7
147	Timeworks	2
161	Topaz	47
162	Toshiba	12
164	Xerox	90, 91
163	Xerox Educ. Pub.	Cover 3

Stickybear is here

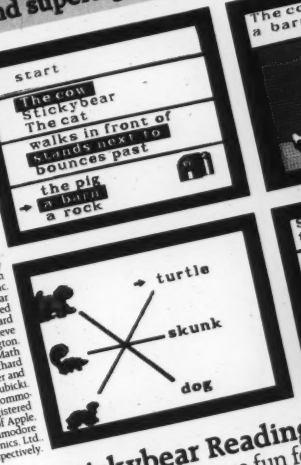
with the learning programs everyone's been asking for...

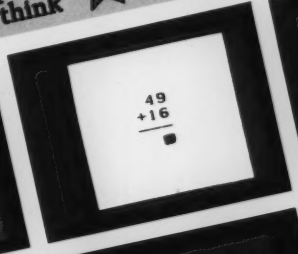
Multiple levels of play and superb graphics

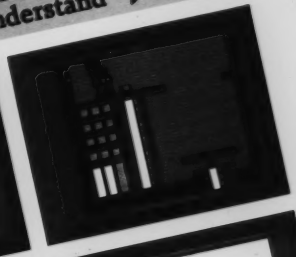
Learning concepts that make kids think

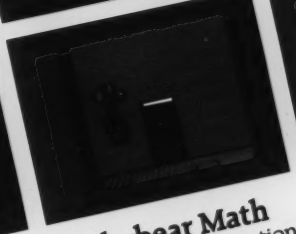
Simple instructions kids can understand

Outstanding quality and value









© Weekly Reader 1985
Stickybear is a registered trademark of Optimum Resource, Inc.
Stickybear programs developed by Optimum Resource, Inc.
Stickybear Reading created by Richard Hefter and Steve Worthington.
Stickybear Math created by Richard Hefter and Susan Dubicki.
Apple and Commodore 64 are registered trademarks of Apple Inc., and Commodore Electronics, Ltd. respectively.

A/M07AM35

Stickybear Reading

Word and sentence fun for ages 5 to 8

Kids build language skills with this 3-activities-in-1 program as they **Match the Word, Find the Word,** or **Build a Sentence.** And **Stickybear Reading** has something totally delightful — animation that turns the words and sentences printed on the screen into real live action! Enough choices for thousands of sentences and hours of fun!

Get these great extras with Stickybear Reading:

- 32-page full-color book
- Stickybear Family poster
- Stickybear Stickers
- Guide

Now available for use with Apple personal computers. Retail Price: $39.95 each. Available for Commodore 64 in the first quarter of 1985.

Look for our software in finer computer stores everywhere. Or call toll-free 800-852-5000, Dept. AM-35.

Stickybear Math

Addition and subtraction fun for ages 6 to 9

Turn practice in addition and subtraction into adventure! Every time kids get a set of problems right, they help get Stickybear out of one of 10 sticky situations. And the program adjusts automatically to the right level of difficulty for each user. Program has 20 levels of difficulty, and can set up problems for up to 25 children.

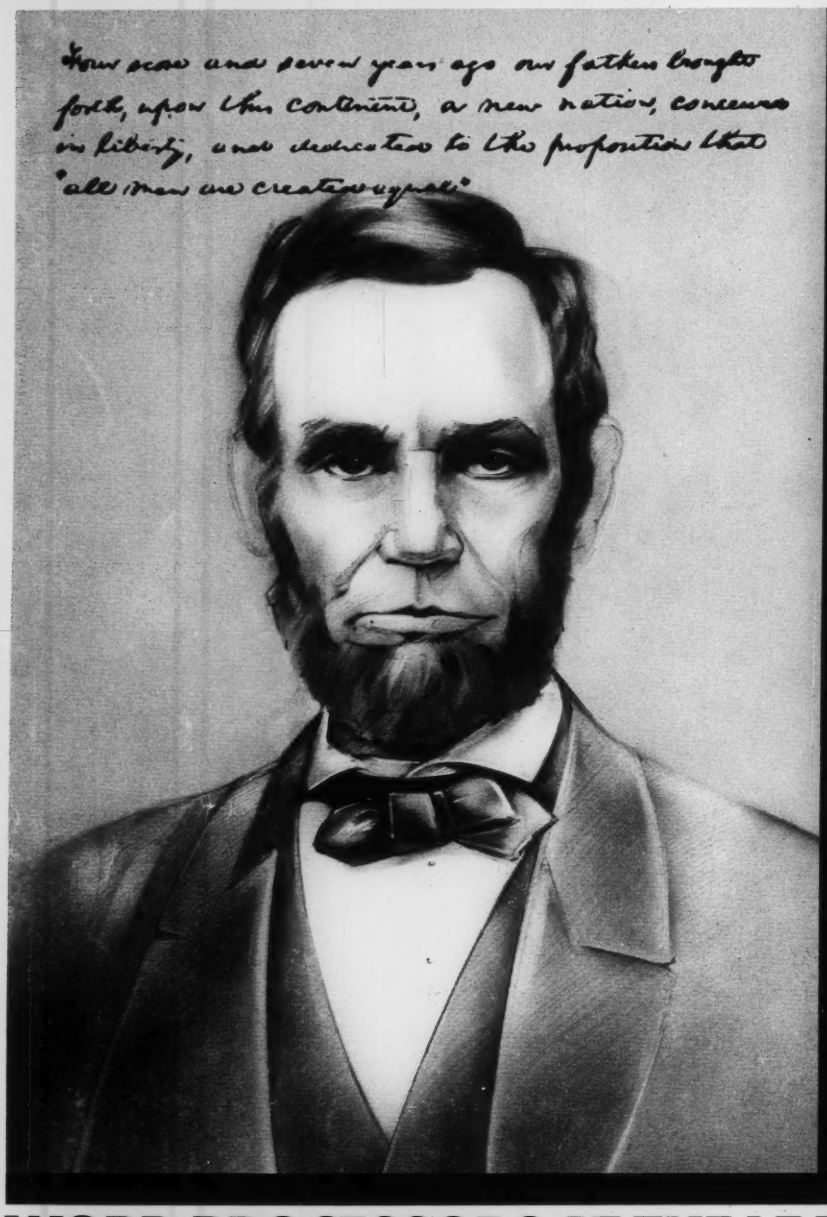
Get these great extras with Stickybear Math:

- Stickybear poster
- Stickybear stickers
- Guide

Weekly Reader Family Software

A division of Xerox Education Publications
Middletown, CT 06457

CIRCLE 164 ON READER SERVICE CARD


Four score and seven years ago our fathers brought
forth, upon this continent, a new nation, conceived
in liberty, and dedicated to the proposition that
"all men are created equal."

The picture in this ad is actually an 18" by 24" collector's item—an originally commissioned museum-quality print. This month, the Gettysburg print is yours, absolutely free, at most computer stores that carry Leading Edge Word Processing.

For the name of the dealer nearest you, give us a call.

800-343-6833,
(617) 828-8150.

LEADING EDGE

Leading Edge Products, Inc.
Systems and Software Division
225 Turnpike Street, Canton, MA 02021

WORD PROCESSORS AT THE LEADING EDGE

Ah, the great ones . . .

They organized their ideas, their intuitions, their idioms. They set them down, sorted them out, arranged them and re-arranged them till they came out right.

They used small scraps of paper to record huge hunks of Truth; primitive tools to produce profound prose. But when the words finally went forth, they made indelible marks on all who read them.

The amazing thing is that these monumental processors of words, did it without the benefit of monumental help.

Like Leading Edge Word Processing: the easiest to use, yet most potent piece of software ever created to take full advantage of all the power inherent, but until now un-tapped, in today's most sophisticated personal computer. (Like the IBM® PC and the even faster and more powerful Leading Edge™ PC.)

The heart and soul of it is a 5¼" floppy disk, elegantly logical instruction manual and documentation . . . everything. And what you end up with is word processing at the leading edge.

LEADING EDGE™ WORD PROCESSING FROM $100

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES CORPORATION.
LEADING EDGE IS A TRADEMARK OF LEADING EDGE PRODUCTS, INCORPORATED.

CIRCLE 130 ON READER SERVICE CARD